MEETING OVERVIEW

Tautog Management Board
May 4, 2026
9:00 - 10:30 a.m.

Chair: Matt Gates (CT)	Technical Committee Chair: Sandra Dumais (NY)	Law Enforcement Committee Representative: Brian Scott (NJ)
Vice-Chair: Rich Wong (DE)	Advisory Panel Chair: Vacant	Previous Board Meeting: October 27, 2025
Voting Members: MA, RI, CT, NY, NJ, DE, MD, VA, NMFS (9 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from October 2025

3. Public Comment – At the beginning of the meeting public comment will be taken on items not on the agenda. Individuals that wish to speak at this time should use the webinar raise your hand function and the Board Chair will let you know when to speak. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance, the Board Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Technical Committee Report on Board Tasks (9:15-10:00 a.m.)

Background

- In October 2025, the Board reviewed the 2025 assessment update, which determined that overfishing is occurring the NJ-NYB and DMV regions.
- As per Amendment 1, the Board requested projections from the Technical Committee for the harvest reductions necessary to have a 50% probability of achieving the F target in 3 and 5 year timeframes. The Board also requested the use of the Risk & Uncertainty Tool, as well as a qualitative review of new fishery-independent indices from the DMV region **(Briefing Materials)**.

Presentations

- Technical Committee Report by S. Dumais

5. Consider Guidance to Plan Development Team for Draft Addendum (10:00-10:30 a.m.)
Possible Action

Background

- In response to the 2025 assessment update, the Board initiated an addendum to address the changes in stock status for NJ-NYB and DMV. The Draft Addendum will also consider allowing for the MARI and LIS regions to modify management for precautionary or alignment purposes.
- The Advisory Panel met to review the 2025 assessment update and provide additional input for Board consideration (**Supplemental Materials**).

Presentations

- Amendment 1 Guidance and AP Comments by J. Boyle

6. Other Business/Adjourn

Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
703.842.0740 • 703.842.0741 (fax) • asmfc.org

MEMORANDUM

TO: Tautog Management Board

FROM: James Boyle, FMP Coordinator

DATE: April 28, 2026

SUBJECT: Tautog Advisory Panel Review of 2025 Stock Assessment Update

A Tautog Advisory Panel (AP) meeting was scheduled for April 21st to review the 2025 stock assessment update and provide comments ahead of the Board considering direction to the Plan Development Team for Draft Addendum I.

AP Members in attendance*:* John Mihale (NY), Carey Evans (DE)

ASMFC Staff: James Boyle, Katie Drew, Samara Nehemiah

2025 Tautog Stock Assessment Update

Carey Evans (DE): The assessment is missing out on the pot and trap survey in Delaware that has been conducted for at least the last decade, and 9 out of 11 reefs are within state waters. Maryland charter boats and Virginia also have their own tagging programs to provide additional data. Wave data from 2023 and 2024 show a lack of effort and harvest in the fall because many for-hire industry members and recreational anglers were targeting bluefin tuna, but they were shut out of the bluefin tuna fishery in 2025 causing the tautog numbers to increase again.

John Mihale (NY): We keep doing the same seine surveys that are not accounting for the species moving to other areas and are consequently not reflecting the current stock. Tautog have moved to the south shore inlets with good tidal flows, particularly to bridges that underwent restoration efforts that improved tautog habitat. Additionally, the majority of fish from the recreational fishery and a significant portion of the commercial fishery use rod and reel, and there needs to be a commercial rod and reel survey.

Draft Addendum I

Carey Evans (DE): Supports status quo. A 4-8% cut would be manageable but do not want to see an increase in the minimum size, since the fish already are able to reproduce multiple times before they can be harvested. The other options in the document should allow for cuts or closures to be chosen in any wave to allow for the fishery to pick the least disruptive time.

John Mihale (NY): Supports status quo. Opposes any further regulations on both the recreational and commercial fisheries. The size limit allows for ample opportunity for the fish to

reproduce multiple times before harvest. Furthermore, the limit already causes many undersized fish to be released, which is causing increases in post-release mortality. Additionally, inconsistent changes in regulations in NJ-NYB could push New York harvesters into Long Island Sound. Tautog are abundant but are undercounted in the fishery-independent surveys due to their shift from past locations.

MOST BLACKFISH CAUGHT (RECREATIONAL) BY ROD + REEL
LARGE PCT OF COMMERCIAL CATCH ALSO BY ROD + REEL

age 13 and to 0.12 - 0.16 inches per year after age 17 (Cooper 1967) Tautog are long lived fish with males living longer than 30 years and females around 25 years (Cooper 1966, Hostetter and Munroe 1993).

As stated above, many variables may affect the observed length of an individual tautog at a given age, and age-length keys show significant overlap of age groups by length. On average, Table 1 provides a reasonably accurate guide.

Table 1. Tautog length-at-age relationship.

Length (inches)	Age (years)
3	1
5.5	2
9	3
10.5	4
12.5	5
14	6
15.5	7
17	8
18	9
19	10
21	15
22	20

REC
APR 28 2026
By: .....

John George Mihale
153 California Place North
Island Park, NY 11558

04/23/2026

1.2.1.7 *Feeding*

Larval tautog probably feed on water column plankton although no specific data are available.

Juvenile tautog feed primarily on small benthic and pelagic invertebrates including: copepods, amphipods, isopods, ostracods, polychaetes, crabs and mussels (Olla et al. 1975, Festa 1979, Grover 1982, Sogard et al. 1992, Dorf 1994) . The composition of the juvenile diet changes with fish size. In Narragansett Bay, Rhode Island, small young-of-the-year (0.8 - 2.0 inches total length) primarily consumed amphipods and copepods. Juveniles 2.0 -2.7 inches in length consumed a variety of invertebrates. The largest young-of-the-year (2.7 - 3.9 inches) ate mainly small shrimp and crabs (Dorf 1994). Similar diets were reported in New Jersey (Festa 1979, Sogard et al. 1992) and Chesapeake Bay waters (Orth and Heck 1980). In New York waters, juveniles 4.1 - 8.1 inches in length fed primarily on blue mussels throughout the year (Olla et al. 1975). Larger juveniles (7.9 - 12.6 inches) in New Jersey were observed to feed on xanthid crabs (Festa 1979).

Adult tautog feed primarily on the blue mussel (*Mytilus edulis*) and other shellfish throughout the year. The diet can be extremely varied depending on location and availability. The following items have been found to be eaten by adult tautog: barnacles, various crabs, sand dollars, amphipods, isopods, shrimp, lobsters, periwinkles, scallops, soft shell clams and razor clams (Bigelow and Schroeder 1953, Olla et al. 1974, Steimle and Ogren 1982, Auster 1989).

Adults grasp mussels using their large canine teeth, tearing them from the surrounding surface by shaking their heads. Small mussels are swallowed whole, while larger, hard-shelled ones are crushed by the pharyngeal teeth prior to swallowing. Canine teeth are not used for crushing shells (Olla et al. 1974).

IF BLACKFISH ARE SEXUALLY MATURE AT 7-12 INCHES
THEY COULD CONCEIVABLY SPAWN 4-5 TIMES BEFORE
THEY CAN BE REMOVED THROUGH FISHING. MAJORITY OF STATES
HAVE A 16" RECREATIONAL SIZE LIMIT AND 90% OF
TAUTOG REMOVALS ARE BY THE RECREATIONAL FISHERY
NO CHANGES ARE NEEDED — STATUS QUO

MEETING OVERVIEW

American Lobster Management Board
May 4, 2026
10:45 a.m. – 12:15 p.m.

Chair: Renee Zobel (NH) Assumed Chairmanship: 03/25	Lobster Technical Committee Chair: Tracy Pugh (MA) Jonah Crab Technical Committee Chair: Corinne Truesdale (RI)	Law Enforcement Committee Rep: Rob Beal (ME)
Vice Chair: John Maniscalco (NY)	Lobster Advisory Panel Chair: Grant Moore (MA) Jonah Crab Advisory Panel Chair: Sonny Gwin (MD)	Previous Board Meeting: February 3, 2026
Voting Members: ME, NH, MA, RI, CT, NY, NJ, DE, MD, VA, NMFS, NEFMC (12 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from February 2026

3. Public Comment – At the beginning of the meeting, public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance, the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Technical Committee Report on Board Tasks (11:00-11:35 a.m.) Possible Action

Background

- In October 2025, after reviewing the results of the stock assessment, the Board directed the Technical Committee (TC) to estimate the benefits to the GOM/GBK fishery that would have resulted from implementing the minimum gauge size increases under Addendum XXVII that were ultimately repealed. The TC provided an analysis to project impacts to the fishery if the gauge changes had been implemented **(Briefing Materials).**
- The Board tasked the TC to provide input on a proposal to modify the lobster fishery season closure in LCMA 5. The TC met via webinar on April 10, 2026 to discuss this proposal and provide input **(Briefing Materials).**

Presentations

- Technical Committee Report by T. Pugh

Board Actions for Consideration at the Meeting

- Consider action to change LCMA 5 season closure dates

5. Consider Management Strategy Evaluation Steering Committee Nominations (11:35-11:45 a.m.) Action

Background

- After considering the findings of the 2025 stock assessment, the Board requested the TC update and review the process for conducting an MSE for the GOM/GBK stock **(Briefing Materials).**
- As an initial step, the Board agreed to form a steering committee to 1) review existing management objectives, as outlined in Amendment #3 and subsequent addenda, relative to the current GOM/GBK stock status, and social/economic conditions facing the fishery today, and 2) develop a process that would clearly identify new management objectives (across all stakeholders), to better understand socioeconomic status and concerns, and to identify potential management tools.
- The states provided nominations for individuals to serve on the steering committee, including representation from the Board, TC, Commission staff, the Commission's Committee on Economics and Social Sciences, industry stakeholders, and the Commission's Assessment and Science Committee or Management and Science Committee with past experience in MSE **(Supplemental Materials).**

Presentations

- Steering Committee Nominations by C. Starks

Board Actions for Consideration at the Meeting

- Consider approval of steering committee membership

6. Reports from Gulf of Maine States on Industry Surveys and Meetings (11:45-11:55 a.m.)

Background

- Concurrent with the implementation of Addendum XXXII, the Gulf of Maine states agreed to work with the lobster industry to develop management strategies to ensure the long-term health of the resource and the coastal communities it supports.
- The Board requested Maine and New Hampshire provide updates on industry meetings and possible alternative management measures to those of Addendum XXVII at each quarterly meeting.
- Maine, New Hampshire, and Massachusetts have completed industry meetings and surveys to gather input on management approaches.

Presentations

- Update from Gulf of Maine States on Industry Meetings by C. Wilson, R. Zobel, and B. Glenn

7. Update on Request for Information on Alternative Gear Marking Framework (11:55 a.m. - 12:00 p.m.)

Background

- The New England and Mid-Atlantic Fishery Management Council (Councils) are developing a joint alternative gear marking framework adjustment to provide alternative fixed gear surface marking requirements in all New England and Mid-Atlantic Fishery Management Council fishery management plans. This regulatory modification would allow for the use of fixed gears without a persistent buoy line (i.e., on-demand gear.
- The Councils met in September and October 2025 and each agreed to postpone further action on the Framework until additional information on ropeless gear and visualization

technology, as solicited through a NMFS Request for Information, is available to inform stakeholder input and Council decision-making.

Presentations

- Update on Request for Information for Alternative Gear Marking Framework by A. Murphy

8. Consider Outstanding Management Changes (12:00-12:10 p.m.) Possible Action

Background

- At the February 2026 meeting, the Board requested to review a list of management changes that have been discussed by the Lobster Conservation Management Teams at the next meeting.

Presentations

- Outstanding Management Changes by C. Starks

Board Actions for Consideration at the Meeting

- Consider initiating management action to address outstanding management changes

9. Review and Populate Advisory Panel Membership (12:10-12:15 p.m.) Action

Background

- Chris Townsend, a lobster trap fisherman from Massachusetts, has been nominated to serve on the Lobster Advisory Panel.

Presentations

- Advisory Panel Nominations by T. Berger

Board Actions for Consideration at the Meeting

- Approve advisory panel nominations

10. Other Business/Adjourn (12:15 p.m.)

Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
703.842.0740 • asmfc.org

MEMORANDUM

Revised April 27, 2026

To: **American Lobster Management Board**

From: **Tina Berger, Director of Communications**

RE: **Advisory Panel Nomination**

Please find attached a new nomination to the American Lobster Advisory Panel – Christopher Townsend, a commercial pot fisherman from Massachusetts. He replaces Eric Lorentzen. Please review this nomination for action at the next Board meeting.

If you have any questions, please feel free to contact me at (703) 842-0749 or tberger@asmfc.org.

Enc.

cc: Caitlin Starks

American Lobster Advisory Panel

Maine (4)

Jon Carter (comm/pot)
333 Main Street
Bar Harbor, ME 04609
Phone: (207)288-4528
CARTERLOB@GMAIL.COM
Appt. Confirmed: 5/30/96
Appt. Reconfirmed 7/26/00
Appt. Reconfirmed 1/2/06
Appt Reconfirmed 5/10
Confirmed Interest: 10/21

Christopher Welch
339 Alfred Road
Kennebunk, ME 04043
Phone: 207.205.2093
littleskeet@ymail.com
Appt. Confirmed: 8/2/22

Eben Wilson (commercial inshore/offshore trap)
5 Lincoln Street
PO Bix 87
East Boothbay, ME 04544
207.380.6897
ebensail@gmail.com
Appt Confirmed 1/25/22

Jeff Putnam (commercial inshore - out to 20 miles - trap)
107 Littlefield Road
Chebeague Island, ME 04017
207.650.3327
Putnamjeff543@gmail.com
Appt Confirmed 1/25/22

New Hampshire (2)

Robert Nudd (comm/inshore pot)
531 Exeter Road
P.O. Box 219
Hampton, NH 03842
Phone (eve): (603)926-7573
LOBSTAMAN@MYFAIRPOINT.NET
Appt. Confirmed: 10/30/95
Appt. Reconfirmed 9/15/99
Appt. Reconfirmed 1/2/06
Appt Reconfirmed 5/10
Confirmed Interest: 9/21

James A. Willwerth (comm./trap)
10 Mill
Hampton Falls, NH 03844
Phone (day): (603) 765-5008
Phone (eve): (603) 926-3139
JAW080257@comcast.net
Appt Confirmed 10/22/12

Massachusetts (4)

Arthur Sawyer Jr. (comm pots)
368 Concord Street
Gloucester, MA 01930
Phone: (978)281-4736
FAX: (978)281-4736
sooky55@aol.com
Appt. Confirmed: 1/29/01
Appt. Reconfirmed 1/2/06; 5/10; 9/15; 8/18
Confirmed Interest: 9/21

Grant Moore (comm/offshore pot)
4 Gooseberry Farms Lane
Westport, MA 02790
Phone (day): 508.971.2190
Phone (eve): 508.636.6248
FAX: 508.636.5789
grantmoore55@gmail.com
Appt. Confirmed 11/2/15
Appt. Reconfirmed 8/18
Confirmed Interest: 9/21

Todd Alger (recreational diver)
7 Holly Street
Hingham, MA 02043
Phone: 339.236.0736
Todd.alger@gmail.com
Appt. Confirmed: 8/2/22

Christopher Townsend (comm./trap)
41 Highland Road
PO Bix 645
North Truro, MA 02652
508.237.1797
captchevy@yahoo.com

American Lobster Advisory Panel

Rhode Island (2)
Lanny Dellinger (comm./pot)
160 Snuffmill Road
Saunderstown, RI 02874
Phone (day): (401)932-5826
Phone (eve): (401)294-7352
lad0626@aol.com
Appt Confirmed 2/21/06
Appt Reconfirmed 5/10

Vacancy (comm/offshore pot)

Connecticut (2)
John Whittaker (comm./pot)
37 Spring Street
Groton, CT 06340
Phone (day): (860)287-4384
Phone (eve): (860)536-7668
FAX: (860)536-7668
whittboat@comcast.net
Appt Confirmed 2/21/06
Appt Reconfirmed 5/10
Confirmed Interest: 9/21

Vacancy (comm pot)

New York (2)
George Doll (comm/inshore pot)
70 Seaview Avenue
Northport, New York 11768
Phone: (631)261-1407
FAX: (631)261-1407
Appt. Confirmed: 11/29/00
Appt. Reconfirmed 1/23/06
Appt Reconfirmed 5/10

James Fox (comm/pot)
152 Highland Drive
Kings Park, NY 11754
Phone: (631)361-7995
jcfox22@verizon.net
Appt. Confirmed: 10/16/01
Appt. Reconfirmed 1/23/06
Appt Reconfirmed 5/10

New Jersey (2)
John Godwin (processor)
1 Saint Louis Avenue
Point Pleasant Beach, NJ 08742
Phone: 732.245.0148
FAX: 732.892.3928
JOHN@POINTLOBSTER.COM
Appt Confirmed 11/2/15

Joe Fiorentino (rec diver)
40 Beechwood Ct
Bangor, PA 18013
Phone: 610.704.2687
joefdive@gmail.com
Appt Confirmed 2/3/26

Maryland
Earl Gwin
10448 Azalea Road
Berlin, MD 21811
Phone: (401) 251-3709
Email: sonnygwin@verizon.net
Appt confirmed 11/1/15
Confirmed Interest: 9/21

ATLANTIC STATES MARINE FISHERIES COMMISSION

Advisory Panel Nomination Form

This form is designed to help nominate Advisors to the Commission's Species Advisory Panels. The information on the returned form will be provided to the Commission's relevant species management board or section. Please answer the questions in the categories (All Nominees, Commercial Fisherman, Charter/Headboat Captain, Recreational Fisherman, Dealer/Processor, or Other Interested Parties) that pertain to the nominee's experience. If the nominee fits into more than one category, answer the questions for all categories that fit the situation. **Also, please fill in the sections which pertain to All Nominees (pages 1 and 2). In addition, nominee signatures are required to verify the provided information (page 4), and Commissioner signatures are requested to verify Commissioner consensus (page 4). Please print and use a black pen.**

Form submitted by: Raymond Kane (your name) State: MASS

Name of Nominee: Christopher Townsend

Address: 41 Highland Rd PO Box 645

City, State, Zip: North Truro, MA 02652

Please provide the appropriate numbers where the nominee can be reached:

Phone (day): 508-237-1797 Phone (evening): _____

FAX: _____ Email: captchevy@yahoo.com

. . . . . .

FOR ALL NOMINEES:

1. Please list, in order of preference, the Advisory Panel for which you are nominating the above person.
   1. Lobster AP
   2. _____
   3. _____
   4. _____
2. Has the nominee been found in violation of criminal or civil federal fishery law or regulation or convicted of any felony or crime over the last three years?

   yes_____ no X

3. Is the nominee a member of any fishermen's organizations or clubs?

yes X no _____

If "yes," please list them below by name.

Mass lobstermans Association

4. What kinds (species) of fish and/or shellfish has the nominee fished for during the past year?

lobster

5. What kinds (species) of fish and/or shellfish has the nominee fished for in the past?

lobster — cod, haddock, pollock

Tuna

fluke

FOR COMMERCIAL FISHERMEN:

1. How many years has the nominee been the commercial fishing business? 34 years

2. Is the nominee employed only in commercial fishing? yes _____ no X

3. What is the predominant gear type used by the nominee? lobster traps

4. What is the predominant geographic area fished by the nominee (i.e., inshore, offshore)? cape cod bay, outer cape, federal water/ stellwagon bank

FOR CHARTER/HEADBOAT CAPTAINS:

1. How long has the nominee been employed in the charter/headboat business? _____ years

2. Is the nominee employed only in the charter/headboat industry? yes _____ no_____

   If "no," please list other type(s)of business(es) and/occupation(s):_____

   _____

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

   _____

FOR RECREATIONAL FISHERMEN:

1. How long has the nominee engaged in recreational fishing? _____ years

2. Is the nominee working, or has the nominee ever worked in any area related to the fishing industry? yes _____ no _____

   If "yes," please explain.

_____

_____

_____

FOR SEAFOOD PROCESSORS & DEALERS:

1. How long has the nominee been employed in the business of seafood processing/dealing?
   5 years

2. Is the nominee employed only in the business of seafood processing/dealing?

   yes _____ no X If "no," please list other type(s) of business(es) and/or occupation(s):

   lobster fisherman

   _____

   _____

3. How many years has the nominee lived in the home port community? _____ years

If less than five years, please indicate the nominee's previous home port community.

_____

FOR OTHER INTERESTED PARTIES:

1. How long has the nominee been interested in fishing and/or fisheries management? _____ years

2. Is the nominee employed in the fishing business or the field of fisheries management?
yes _____ no _____

If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

FOR ALL NOMINEES:

In the space provided below, please provide the Commission with any additional information which you feel would assist us in making choosing new Advisors. You may use as many pages as needed.

I began lobster fishing in 1983 and started my own business in 1992. I began with 100 traps and a small outboard boat and now have 800 traps and an offshore boat. I have fished area 1, OCLMA, and federal waters. I have also run educational lobster trips for over 20 years. I owned a seafood market for 12 years as well as a "fish n chips" restaurant. I have been a member of mass lobstermans association since I first started on my own in 92'.

I have a broad circle of fishing friends from Maine + NJ and beyond to fl, the gulf coast and even Alaska. My daughter graduated from MMA and is heavily involved in fisheries mgt. I believe I bring a bi partisan view to fisheries management and my goal is to do whats best for the fishery as a whole.

Nominee Signature: Capt. Chris Townsend Date: 3/12/2026

Name: Chris Townsend
(please print)

COMMISSIONERS SIGN-OFF (not required for non-traditional stakeholders)

Daniel J McKiernan
State Director

Sarah N Peake (for Rep. Jennifer Armini)
State Legislator

Raymond N. Kane
Governor's Appointee

From: Mark Phillips
To: Info (ASMFC)
Subject: [New] [External] Striped Bass Fishery Hudson River
Date: Monday, April 27, 2026 3:11:09 PM
Attachments: image001.png

Good day,
I am a resident of NY an avid striper fisherman in both NY and MA. I have sent a similar email to the NYS DEC and I am writing regarding a concern with the fishing on the Hudson River targeting striped bass. This fishing often results in fish being kept that exceed the slot limit. It is great that anglers without routine access to saltwater opportunities do have access to this resource. With that said I have witnessed possession of many fish above slot in person and many more in social media posts. There are some compounding issues that create this issue:

- Majority of the fishing is a night
- Many of the fisherman are not typical saltwater anglers and may not understand regulations
- Countless access points for fisherman from shore and numerous access points via boat-very difficult to regulate.

As the regulations for this fish are established in a multistate alliance I do not think the burden of the education and enforcement should fall solely on NYS. Suggested opportunities to protect the fishery:

- Education efforts
- River based patrol (boat) specifically at night when the peak of the fishing is occurring.
- Increase enforcement at marinas/boat launches
- Review of multi-week season closure to allow Striped bass the ability to safety spawn or a season is developed specifically for Hudson River area.

I amazed by the seasonality of the fishery and the migration of the fish and would be remiss not to bring this to your attention. I am sure your team is aware of this and actively working on solutions and will support in any way I can.
Regards,
MP

Mark Phillips
Mark@rayborncc.com
C: (845) 326-2326
www.Rayborncc.com

From: Emilie Franke
To: Toni Kerns; Tina Berger
Subject: Fw: [New] [External] Striped Bass Measurement
Date: Tuesday, April 28, 2026 11:44:55 AM

Get Outlook for iOS

From: RomanAround5246 <romanaround5246@gmail.com>
Sent: Wednesday, April 8, 2026 4:50:01 PM
To: Emilie Franke <EFranke@ASMFC.org>
Subject: [New] [External] Striped Bass Measurement

Hi Emilie,

I hope you and everything is well your way. I found this online and wanted to bring it to your attention. I sent in a comment about the process for measuring striped bass during the input stage of the process and this I believe emphasizes my point. For measuring striped bass, the Committee passed the official way to measure striped bass. It was having to pinch the tail while measuring it with a measuring device. As you can see by this picture, it is impossible to do without proper handling methods made up by the Committee.
1. Having to hold the fish and squeeze the tail works well but that takes up both your hands.
2. Having to place the fish on the ground in the grass, sand or boat removes slim off the fish which goes against properly handling the fish.
If they say that catch and release mortality is 9%, the process put in effect on how to measure striped bass is going to increase that number. Also, I saw videos of the blitz fishing on the coast of New Jersey in September, October and November and the anglers on the beach are dragging the striped bass from the water across the sand then trying to measure them with the ridiculous procedure of having to lay the fish down, trying to pinch the tail and hold the lips on the tape measure and see where the tail tapes out. That is going to damage more fish. Thank You for listening to my two cents.

Sincerely,

Roman Dudus

Sent from my Galaxy

From: Tom lilly
To: Tina Berger; James Boyle; Bob Beal
Subject: [External] Proposed addendum
Date: Friday, April 24, 2026 9:28:17 AM

Sent from my iPhone
Tina and James will you please post this comment for the menhaden board meeting and also send a copy now to the plan development team, considering the proposed addendum. Please acknowledge receipt.
To the board

I would like to express my concern for any change that would increase the amount of factory fishing in the bay in the spring rather than decreasing it or closing the season in May and June as recommended by the protective options group. As you know from the catch charts the amount of.Menhaden coming into Chesapeake Bay in the spring is decreasing rapidly, and it would seem a “no-brainer“ that all of this limited forge must be protected as this is when it is needed most by our striped bass spawning stock and nesting ospreys . This was the finding and recommendation of your protective options, work group and Osprey sub group, which I am very hopeful you will not ignore.

As I have expressed before, wouldn’t it be much better to leave the destructive factory fishing for the summer only and substantially reduce it in the spring and the fall. In the spring, for the reasons stated and in the fall because the reduction fishery is currently allowed to catch all or all almost all of the potential breeding stock as it leaves the bay in the fall. 70% of the catch is age 1 or younger Fish that have never spawned. The wholesale unprotected catch of these young fish that have never spawned one time migrating from the bay in the fall could be the root of the problem in the spring when so few fish are now coming in.

Thanks for your consideration Tom Lilly, White Haven, Maryland

From: ASMFC
To: Comments
Subject: [New] [External] New public comment for 2026 Spring Meeting
Date: Wednesday, April 29, 2026 5:06:43 AM

2026 Spring Meeting

Action Title
2026 Spring Meeting
Action URL
https://asmfc.org/events/2026-spring-meeting/
Name
joe spirio
Email
joespirio@gmail.com
State
New York
Comment
I have lived, boated, and fished on the south shore of Long Islands Great South Bay and offshore waters from Rockaway to the eastern Fire Islands' shoreline for 50 plus years. I have enjoyed the abundance of natural beauty and respect the rules that the fishery provides. I realize my perspective is limited by my singular experience. However, in a very short amount of time, even I see the stark difference in the Manhaden population that has gone from abundant to scarce! As I understand it, out-of-state commercial vessels have been licensed to scour the Long Island south shore waters and remove large schools at will, even using drones to locate and remove schools that used to appear abundantly on the surface. As you know, they are a food source for numerous species and a natural bait that nature provides to catch more palatable table fare. Please make legislative adjustments in a timely fashion to address this issue. Sincerely J,Spirio

April 28, 2026

James Boyle
Fishery Management Plan Coordinator
Atlantic States Marine Fisheries Commission
1050 N. Highland St., Suite 200 A-N
Arlington, VA 22201

Dear Mr. Boyle and Members of the Menhaden Management Board,

As organizations representing hundreds of thousands of stakeholders from the recreational fishing, boating, and conservation community in Chesapeake Bay and along the Atlantic, we urge the Menhaden Management Board to approve Atlantic Menhaden Draft Addendum II for public comment. We strongly support the range of alternatives in the draft addendum that would reduce the Bay Cap to more precautionary levels and better distribute seasonal harvest. These options would better align management of the fishery with the Board's coastwide ecosystem-based management goals and help ensure sufficient forage availability for iconic species within Chesapeake Bay.

Atlantic menhaden are a critical forage species, and nowhere is their ecological importance more evident than in Chesapeake Bay. However, the current Chesapeake Bay Reduction Fishery Cap does not adequately account for the localized impacts of the fishery on predators that rely on menhaden during key spawning, breeding, and nursery periods. In following with the Commission's commitment to coastwide ecosystem-based management, it is now time to revisit the Bay Cap to better distribute harvest throughout the season to benefit menhaden predators during times of peak biological demand.

In addition, from our perspective, there is strong justification for considering more precautionary harvest measures in the Bay from an economic standpoint, until we have better science to understand Bay menhaden population dynamics and localized impacts from industrial fishing. Recreational and commercial fisheries in the Bay depend on menhaden availability throughout the season, and the economic contributions of these fisheries are substantial and widely distributed across coastal communities, making them an important consideration for the Board, when discussing future Bay-specific menhaden management options.

The two categorical management options proposed in Draft Addendum II – a decrease in the Bay Cap and establishing quota periods – are not mutually exclusive and may be evaluated together as part of a comprehensive strategy to better align menhaden management with the needs of the broader ecosystem. **Importantly, advancing these options for public comment does not predetermine their adoption, but ensures that stakeholders have the opportunity to**

weigh in on various approaches that reflect both the science and community interest in this public resource.

By advancing Draft Addendum II into the public comment period, the Board will take an important step toward fulfilling its responsibility to manage Atlantic menhaden for the benefit of the entire ecosystem and all user groups. Given the ecological and economic importance of Atlantic menhaden, it is essential that this process move forward without delay.

We appreciate the Board's continued commitment to science-based management and stakeholder engagement. We strongly encourage you to approve Draft Addendum II for public comment in May 2026.

Thank you for your consideration.

Sincerely,

American Bird Conservancy

American Sportfishing Association

Angler Action Foundation

BoatU.S.

Bonefish & Tarpon Trust

Coastal Conservation Association

Guy Harvey Ocean Fund

International Game Fish Association

Marine Retailers Association of the Americas

Rhode Island Saltwater Anglers Association

Sportsmen's Alliance Foundation

Theodore Roosevelt Conservation Partnership

Virginia Saltwater Sportfishing Association

Wild Oceans

OMEGA PROTEIN®
Healthy Products for a Healthy World®

April 28, 2026

John D. Held
Executive Vice President,
General Counsel and Secretary

E-mail: jheld@omegaproteininc.com

Via Electronic Mail

Mr. Joseph Cimino, Chair
Atlantic Menhaden Management Board
Atlantic States Marine Fisheries Commission
1050 N. Highland St., Suite 200 A-N
Arlington, VA 22201

Dear Chairman Cimino,

Omega Protein echoes Ocean Harvesters' call to delay any further action on Addendum II to Amendment 3 of the Atlantic Menhaden Interstate Fishery Management Plan until the Menhaden Technical Committee ("TC") has had an opportunity to determine if the proposed actions have any basis in science. The Plan Development Team ("PDT") also made this recommendation. It makes sense to scientifically review the premise of the Addendum before investing resources in further developing a management action that very likely lacks a rational basis.

The Addendum is premised on the supposed need to "reduce the concentration and volume of reduction harvest within Chesapeake Bay from recent levels to allow the ingress of menhaden to distribute throughout Chesapeake Bay." It assumes a problem rather than considering scientific evidence to determine if there is, in fact, any relationship between the reduction fishery and Maryland poundnet catches. All preliminary evidence suggests this is not the case. The lack of any empirical inquiry thus far leads us to conclude that main purpose of the action is to hamstring Omega Protein's and Ocean Harvesters' businesses rather than achieve a legitimate management goal. This is unbecoming of a law- and science-guided management body.

Federal law and the Atlantic States Marine Fisheries Commission's ("ASMFC") guiding documents require management measures to be "based on the best scientific information available."[1] The preliminary research provided by the PDT found no support for proposition that reduction fishery harvest impact poundnet catches in Maryland.

The best it could say was that in 2023 and 2024 – years that menhaden showed up much later than usual (a trend that continued into 2025) – the reduction fishery had "higher than average catch rates in weeks 23-33." Only in 2024, however, does the PDT note that catch-per-unit-of-effort ("CPUE") for the Maryland poundnet fishery "is generally below the 2018-2022

[1] 16 U.S.C. § 5104(a)(2)(A); *see also* Interstate Fisheries Management Program ("ISFMP") Charter, Sec. Six(a)(2).

average."[2] Based on that observation, it surmises that "it is possible that these higher than normal [2024 reduction fishery] catch rates may have affected availability of fish in the upper bay, thereby affecting pound net catches." By contrast, "weekly CPUE [for the Maryland poundnet fishery] in 2023 is generally equal to or greater than the 2018-2022 average, suggesting little influence of the reduction fishery on pound net catches."

Why a similar level of effort by the reduction fishery a little later in the season would impact Maryland poundnet catches one year, but not the other, is unexplained. A more likely culprit is the change in the environment that influenced the late arrival of menhaden over the past three years, a phenomenon that has led to lower catches in all Chesapeake Bay menhaden fisheries.

Ocean Harvesters provided two sets of research that is far more granular than the initial work undertaken by the PDT. Generally speaking, all three sources of data tend to show that Maryland and Virginia catches tend to go up and down together. The work by Dr. Amoldo Valle-Levinson, professor of Coastal Physical Oceanography at the University of Florida, looks at environmental factors that help explain why these catches tend to covary, as well as changes in CPUE. Before any action is taken that would adversely affect Omega Protein and Ocean Harvesters, the Board should make an effort to determine if such economic harm would actually solve the problem it has identified.

We thus urge you and your fellow Board members to refer this research to the Menhaden TC for further analysis before taking any further action on the Addendum.

Very Truly Yours,

John D. Held

[2] But notably, Figure 7 in the PDT Memo shows that CPUE in 2024 exceeded the 2018-2023 average in several weeks, confounding the message that prior reduction fishery catch kept menhaden out of Maryland waters.

OCEAN FLEET
SERVICES

April 23, 2026

Atlantic Menhaden Management Board
Atlantic States Marine Fisheries Commission
1050 N. Highland St., Suite 200 A-N
Arlington, VA 22201

Dear Chairman Cimino,

We submit this letter regarding the Board's Plan Development Team's ("PDT's") continued preparation of an addendum to the Atlantic Menhaden Fishery Management Plan ("FMP") focusing on the purse seine fishery in the lower Chesapeake Bay. We respectfully request that this letter, and the exhibits included herein, be included in the supplementary materials in advance of the Board's May meeting and be distributed to Board members.

In its recent memorandum to the Board, the PDT "recommends to the Board that the Technical Committee would be a more appropriate avenue to conduct a detailed analysis" of the main scientific theory driving the addendum. Specifically, "that a recent shift in timing of the Chesapeake Bay menhaden reduction fishery has resulted in reduced availability of fish in the upper bay and consequent reductions in Maryland pound net harvest of menhaden."

We agree with the PDT. The Board should remove the draft Addendum from the rule-making track and send it to the Menhaden Technical Committee ("TC") because all management actions should be based on the best scientific information available. And as we lay out below, initial analysis by outside scientific and technical experts finds that the factual allegations on which the draft Addendum are based are almost certainly false. There is no purse seine "gauntlet" in the lower Chesapeake that is preventing menhaden from making it up the Bay to Maryland pound nets. Further, as these analyses show, a preliminary physical oceanographic analysis indicates environmental factors may strongly influence menhaden availability to pound nets.

The Board should ensure its deliberations are informed by science and empirical data. Thus, we respectfully request that it task the TC to review this new information and investigate whether other environmental factors determine menhaden availability to pound nets in Maryland, as the PDT recommended.

We attach to this letter two exhibits containing the results of investigations that have been performed. Exhibit A contains the results of a supplemental regression analysis comparing Maryland pound net CPUE with Virginia menhaden purse seine net sets performed by Georgetown Economic Services ("GES") of Washington D.C., using data collected from the Atlantic Coastal

Cooperative Statistics Program ("ACCSP"), and public data contained in last year's Menhaden Task Force Report previously presented to the Board.

Exhibit B is a report prepared by Dr. Arnoldo Valle-Levinson, professor of Coastal Physical Oceanography at the University of Florida. His report, attached as Exhibit B, used data on freshwater flow into the Bay, salinity, temperature, and dissolved oxygen profiles, and Maryland menhaden pound net catch rates to assess the impact of environmental factors such as shifting hypoxia and stratification on pound net catches over the past 12 years. Exhibit C is Dr. Valle-Levinson's *curriculum vitae*.

Exhibit D, included for completeness, is a copy of the letter on the same subjects Ocean Harvesters submitted to the Board for its winter meeting in January. The new analyses attached to this letter confirm and buttress the serious concerns with the underlying gauntlet predicate for this draft Addendum we raised in January.

Maryland pound net catches have indeed decreased, but so has Maryland pound net effort, and the decrease is proportional. Dr. Valle-Levinson's report explains:

> Menhaden catches in Maryland have had a decreasing trend in the last 12 years. Similarly, the trips in Maryland to catch Menhaden show a decreasing trend. Menhaden catches and number of trips in Maryland go hand in hand. However, the catch per unit of effort has not changed over time, despite the marked decrease in 2024.

(Citations omitted.) The data thus fully belies claims of decreasing catch rates in Maryland pound nets being tied to any supposed purse seine "gauntlet."

Further, as to catch per unit of effort ("CPUE"), statistical analyses contained in Exhibit A show that Maryland pound net CPUE and Virginia purse seine net sets are directly related, and the relationship is statistically significant over the entire 13-year time series. By comparing Maryland pound net harvests with Virginia purse seine nets sets, GES found a strong positive relationship between the number of nets set by the Virginia purse seine reduction fishery and Maryland pound net CPUE. When this effort in Virginia is high, the Maryland harvest per trip also tends to be high. The converse is also true.

If the gauntlet hypothesis on which the draft Addendum is fully predicated had any merit, pound net CPUE would be lower when purse seine net sets were higher (that is, the variables would be inversely related). The gauntlet theory may be a convenient talking point to galvanize the Board to initiate the addendum process, but it utterly lacks an empirical foundation. This unsupported hypothesis was coupled with the claim (made in response to a Board member's question when the proposal for the Addendum was first raised) to the effect that Maryland pound net effort had not declined. That claim is also not true. In fact, Dr. Valle-Levinson demonstrates the declines in pound net catches and the decline in pound net effort "go hand in hand." Indeed, when depicted visually in Dr. Valle-Levinson's Figure 2, the correspondence between the two is startlingly clear.

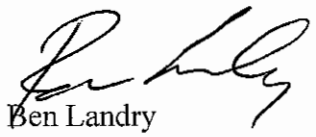
Ocean Harvesters also commissioned Dr. Valle-Levinson to undertake an examination of the broader physical oceanographic variables that may affect menhaden catches in the Bay. In summary, Dr. Valle-Levinson's analysis found correlations between changes in environmental conditions and the availability of menhaden to Maryland pound nets. His report concluded, as follows:

> Results indicate that river discharge in the upper Chesapeake Bay relates to water column stratification in the middle bay, at periods of around 1 and 6 years. Results also show a relationship between river discharge and hypoxic depth at periods of 1 year. Moreover, water column stratification seems related to Menhaden catches. Furthermore, there seems to be a linkage between hypoxia depth and fish catches (and CPUE) in Maryland. In essence, increased discharge leads to increased water column stratification, enhanced hypoxia (decreased hypoxic depth), and reduced fish habitat with increased catches.

Ocean Harvesters respectfully submits that Dr. Valle-Levinson's findings strongly counsel for the Menhaden TC to examine and ground-truth all the predicates for the draft Addendum before the Board proceeds to any further consideration of the proposed damaging and likely unwarranted management measures it contains. Accordingly, the Board should remand this draft Addendum to the Technical Committee for further consideration in light of the information presented in this submission and in light of other equally valid concerns PDT members have raised in working on this ill-conceived Addendum.

Thank you for your consideration of this letter and the issues it presents. Our representatives will be available at the Board meeting to discuss these matters in more detail.

Respectfully submitted,



Ben Landry
Vice President of Public Affairs
Ocean Fleet Services

Exhibit A

Analysis of Maryland Harvest Sizes Per Trip and the Number of Virginian Nets Set

I used the following data:

1. Semi-monthly number of nets set by Virginian fisheries for the period 2016 to 2024 (Table 2 in Lynn Fegley's August 2025 Atlantic Menhaden Board Presentation); and
2. Monthly Maryland Pound Net Harvest and Number of Trips for the period 2016 to 2024.

I aggregated the number of nets set by year and month in order to transform it from a semi-monthly series to a monthly series. Further, I divided the monthly Maryland Pound Net Harvest by the monthly Number of Trips in order to obtain a monthly Maryland harvest per trip.

Next, I regressed the monthly Maryland harvest per trip (the dependent variable) on the following independent variables:

1. The monthly number of nets set by Virginian fisheries,
2. The one-month lag of the Maryland harvest per trip; and,
3. Twelve-month lag of the Maryland harvest per trip. I included the lagged independent variables because the monthly harvest per trip data show strong seasonality and autocorrelation. That is, the size of the harvest per trip in one month affects the harvest per trip in subsequent months.

The table below shows the results of the regression:

	Estimate	Standard Error	t value	p value
Intercept	521.3436	546.6616	0.954	0.3439
Nets Set by VA Fisheries	2.4063	1.0756	2.237	0.0289
1-month Lag of MD Harvest per Trip	0.4669	0.1016	4.594	2.19E-05
12-month Lag of MD Harvest per Trip	0.1878	0.1245	1.508	0.1367

The coefficient of the number of nets set variable is 2.4063 and—with a p value of 0.0289—is statistically significant at the 5 percent level. This result indicates a strong, positive relationship between the number of nets set by Virginian fisheries and the Maryland harvest per trip. Thus, when the number of Virginian nets set is high, the Maryland harvest per trip also tends to be high. Conversely, when the number of Virginian nets set is low, then the Maryland harvest per trip also tends to be low. Since it is highly unlikely that the number of Virginian nets set could be causing the size of the Maryland harvest per trip (or vice versa), the most likely interpretation of this positive relationship is that both variables are responding to a common cause—namely, the extent of the fish presence in the bay.

Exhibit B

Linkage Between Environmental Variables and Menhaden Catches in Mid-Chesapeake Bay

Arnoldo Valle-Levinson

Civil and Coastal Engineering Department

University of Florida

arnoldo@ufl.edu

Overview

This report uses data from the Chesapeake Bay Program to explore possible linkages between environmental variables and Menhaden catches in Chesapeake Bay. The main findings are synthesized in a Summary section at the end of this report.

Data compilation

I have compiled data for daily river discharge (Susquehanna River at Conowingo, MD) from October 1, 1967 to March 19, 2026. I have also compiled data from the Chesapeake Bay program since 1984 for salinity, temperature and dissolved oxygen profiles (https://www.chesapeakebay.net/what/downloads/cbp-water-quality-database-1984-present) at stations CB4.2C, CB4.3C, EE2.1, ET5.2, and LE2.3 (Fig. 1).

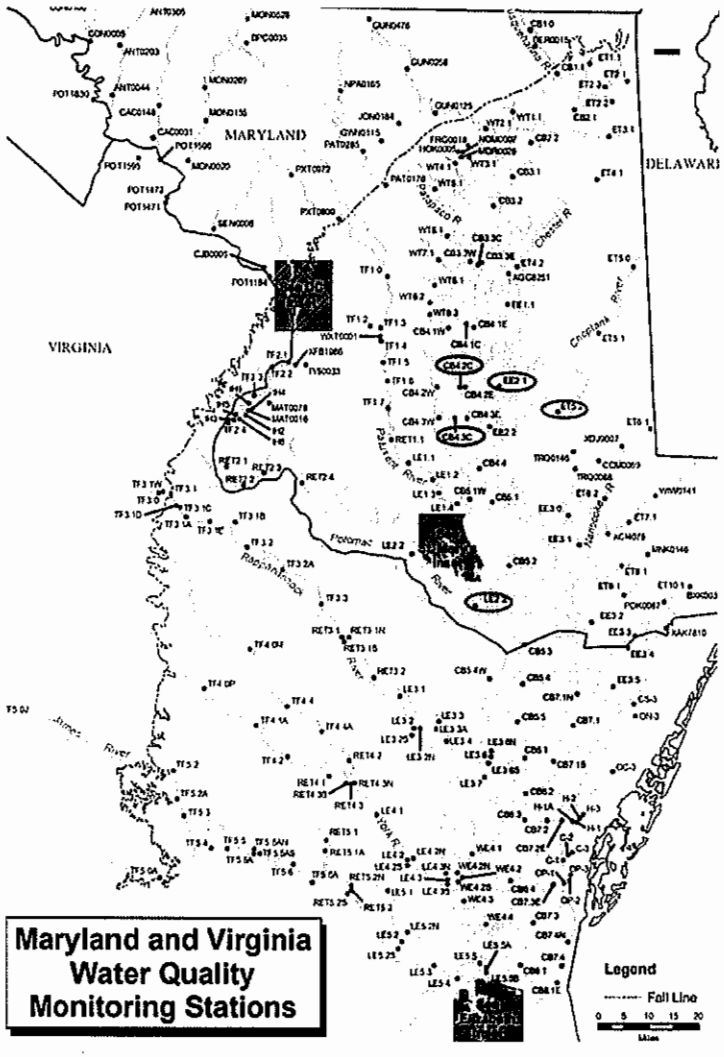


***Figure** 1. Chesapeake Bay map showing sampling stations of the Chesapeake Bay program. The following analyses are over the five stations with color ovals.*

I also used monthly data for Menhaden catches and fishing trips in Maryland from 2013 to 2024 (Fig. 2). Any comparisons between environmental variables and catches in Maryland were made for that 12-year period.

Data Analyses

Comparisons between compiled variables were done through direct inspection of the time series, and through correlations in time and for different periodicities. These correlations are achieved with a technique, *wavelet transform*, that first involves the decomposition of each time series in terms of their periods of greatest variance and assessing how that variance changes over time. Then two *wavelet transforms* are compared with each other to assess how the variance of each time series correlates with each other over the period of measurements. Comparisons of *wavelet transform* are carried out through *cross wavelets* and *wavelet coherences*. *Cross wavelets* quantify

the co-variability of the two time series being compared, while the *wavelet coherences* provide correlation coefficients for different periods of variability and their change over time.

Results

Data analyses yielded the following results for Maryland.

Menhaden catches in Maryland (upper left in Figure 2) have had a decreasing trend in the last 12 years. Similarly, the trips in Maryland to catch Menhaden (upper right of Figure 2) show a decreasing trend. Menhaden catches and number of trips in Maryland (middle left of Figure 2) go hand in hand. However, the catch per unit of effort (catch/trip – middle right of Figure 2) has not changed over time, despite the marked decrease in 2024. A prominent result is that the catches of Menhaden (lower left of Figure 2) and the catch per unit of effort (lower right of Figure 2) show resemblance with the depth of hypoxia. This hypoxia depth was determined as the depth where dissolved oxygen showed values of 2 mg/l and below which, dissolved oxygen decreases.

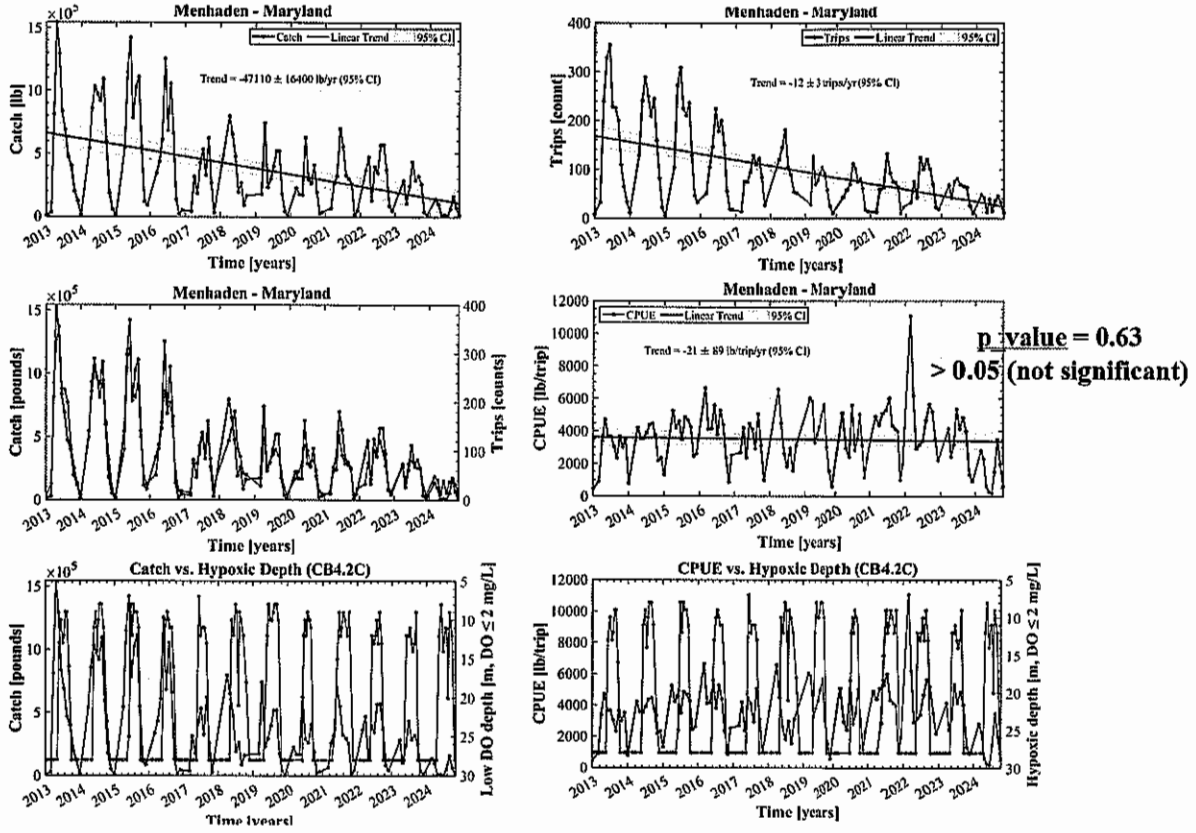


Figure 2*. Upper panels display the trends for Menhaden catches and trips in Maryland. Middle panels illustrate the relationship between catches and trips, and the trend of catch per unit of effort (CPUE) in Maryland. Lower panels show the linkage between catches and hypoxic conditions, and catch per unit of effort and hypoxic conditions.*

More specifically, and using wavelet techniques, Menhaden catches in Maryland seem to be impacted by hypoxia at CB4.2C and CB4.3C over periods of one year (Fig. 3). The *cross-wavelet*

and *wavelet-coherence* analyses (Fig. 3) indicate an antiphase relationship (arrows pointing to the left) between these two variables (catch and hypoxic depth) throughout the 12-year period of data. This means that increased fish catches occur when the hypoxic depth becomes shallower – during summer months.

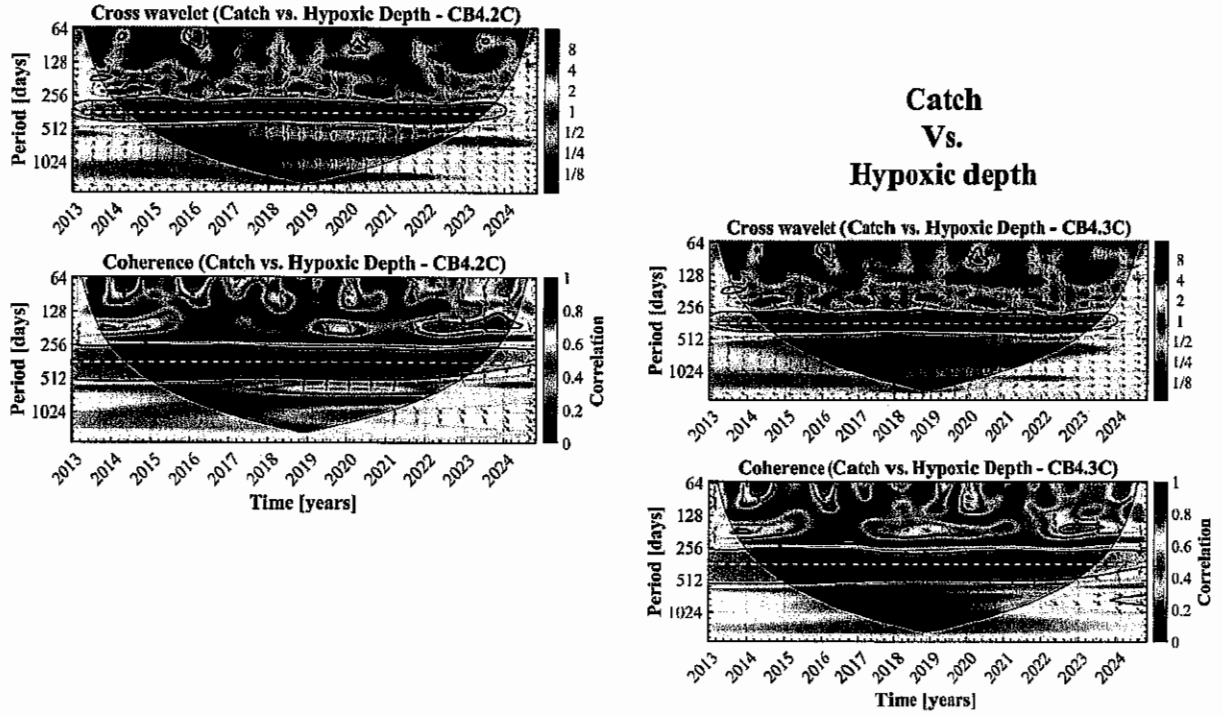


Figure 3. *Cross-wavelet and wavelet coherence between Menhaden catch in Maryland and hypoxic depth at two stations (4.2 and 4.3) in the middle of the Chesapeake Bay. The* ***cross-wavelet*** *plots illustrate how two parameters* ***covary*** *over time (horizontal axis) and at what periods (vertical axis) show their greatest covariance. Cross-wavelets here illustrate marked covariance between the two parameters at periods of 1 year (red bands at 365 days – white dashed line) and throughout the period 2013-2024. The wavelet* ***coherence*** *plots show the correlation squared (values from 0 to 1) between the same two parameters, and how this correlation changes between 2013 and 2024, and at what periods the correlation is strongest (typically 365 days). In all panels, arrows pointing to the right imply direct correlation, while arrows pointing to the left indicate anticorrelation.*

Exploring the menhaden catch per unit of effort (CPUE – catch divided by number of trips) in Maryland, CPUE also seems to be impacted by hypoxia at CB4.2C and CB4.3C over periods of one year (Fig. 4). The response is consistent with that of Figure 3, throughout the entire span of the data available.

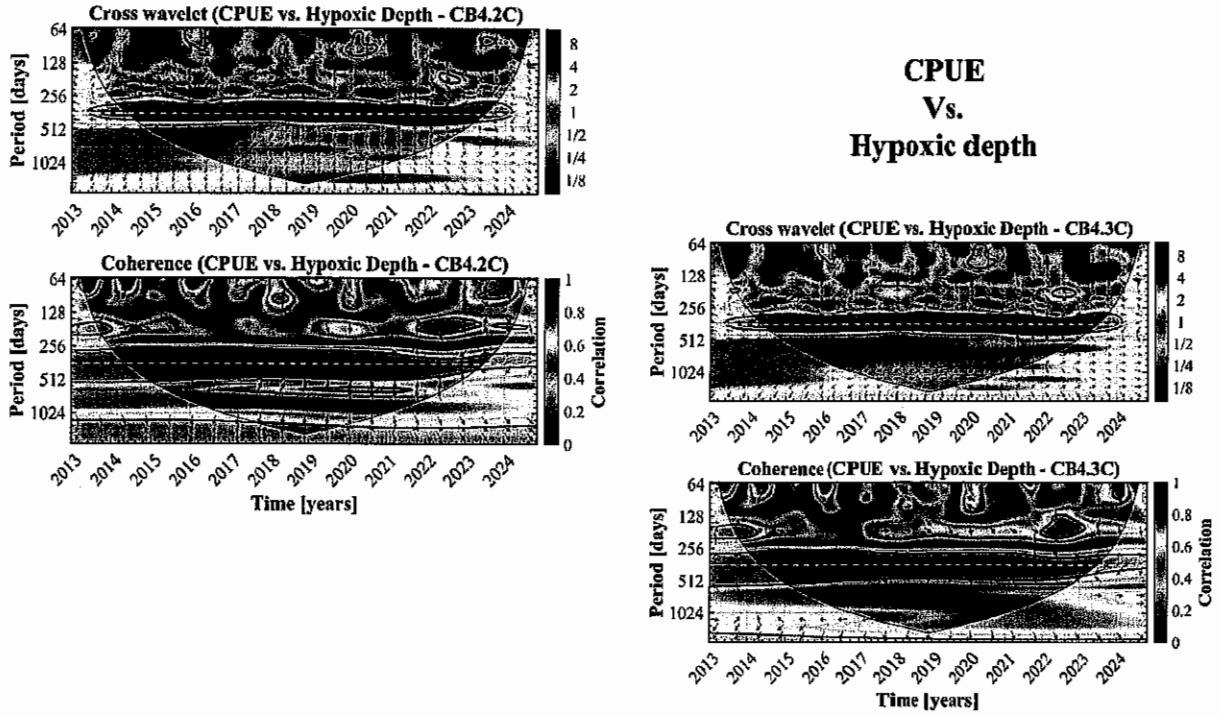


Figure 4. *Cross-wavelet and wavelet coherence between Menhaden CPUE in Maryland and hypoxic depth at two stations (4.2 and 4.3) in the middle of the Chesapeake Bay. Explanations are the same as for Figure 3.*

Moving on to other environmental variables, Menhaden catches and CPUE in Maryland seem related to water column stratification at the deepest stations scrutinized, i.e., at 4.2C, 4.3C and LE2.3 (Fig. 5 & 6). Water column stratification was quantified as the energy required to mix the water column (in Joules per cubic meter), or *potential energy anomaly*. Increased stratification at those stations indicated increased catches and CPUE. Water column stratification at EE2.1 and ET5.2 was not linked to catches or CPUE, likely because it is not well developed at those relatively shallow stations.

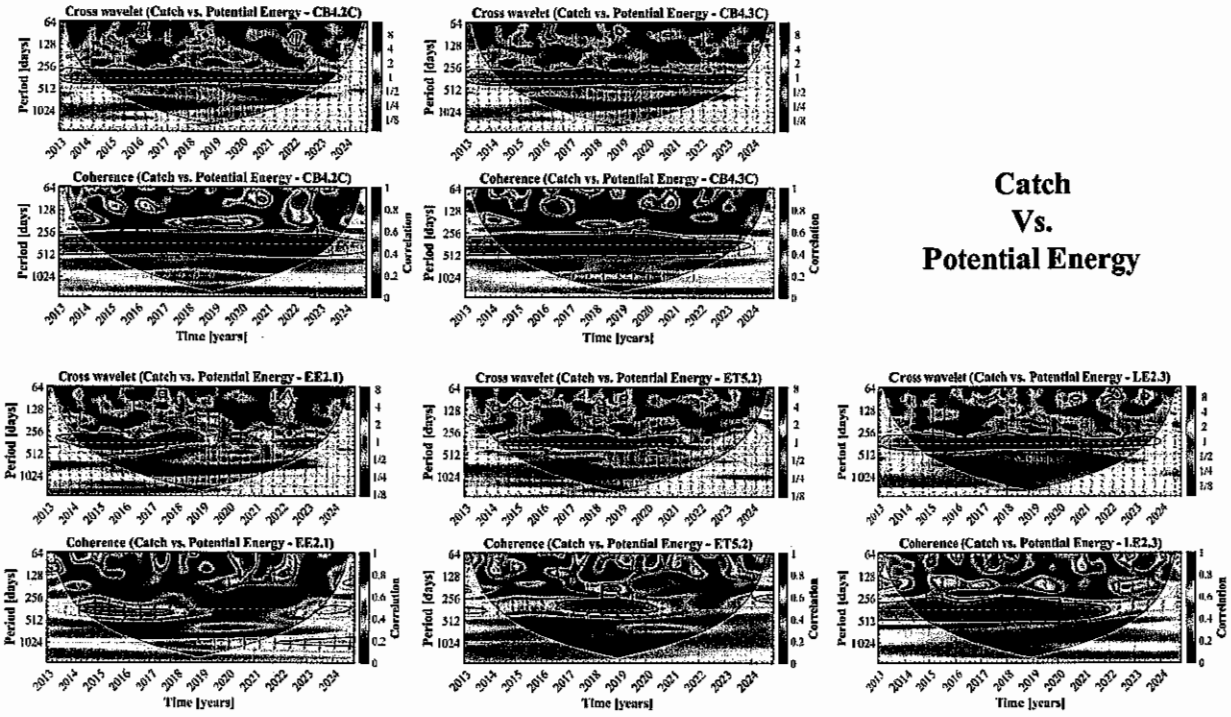


Figure 5*. Cross-wavelet and wavelet coherence between Menhaden catches in Maryland and water column stratification at several stations in the middle of the Chesapeake Bay. Water column stratification is quantified as the potential energy anomaly, in other words, the energy required to mix the water column (appearing simply as 'Potential Energy' on the figures). Explanations are the same as for Figure 3.*

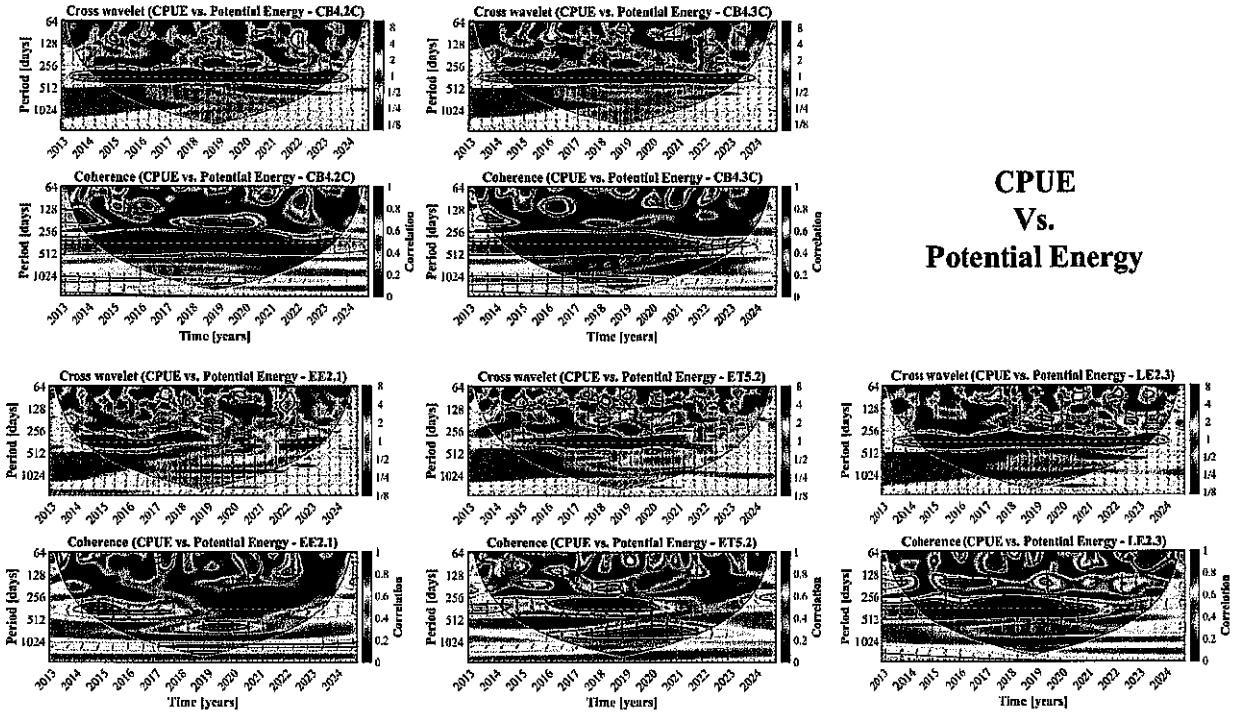


Figure 6. *Cross-wavelet and wavelet coherence between Menhaden CPUE in Maryland and water column stratification at several stations in the middle of the Chesapeake Bay. Explanations are the same as for Figure 3.*

River discharge impacts on stratification in the Bay

As expected, the stratification in the middle Chesapeake Bay is related to Susquehanna River discharge at periods of around 1 and 6 years. Although Figure 7 shows the relationship with station 4.2C, the same results are observed for 4.3C. Furthermore, river discharge is also linked to hypoxic depth (Fig. 8). The phases in Figure 8 suggest that when discharge increases, the hypoxic depth decreases, i.e., an expansion of the hypoxic zone.

River discharge impacts on Menhaden catches

Finally, there seems to be a relationship between Susquehanna River discharge and Menhaden catch in Maryland (Fig. 9). The phase of the wavelet coherence and cross-wavelet calculations suggests that these relationships are nearly direct, with a delay: increased discharge is linked to increased captures, but with a lag in time of 3-4 months.

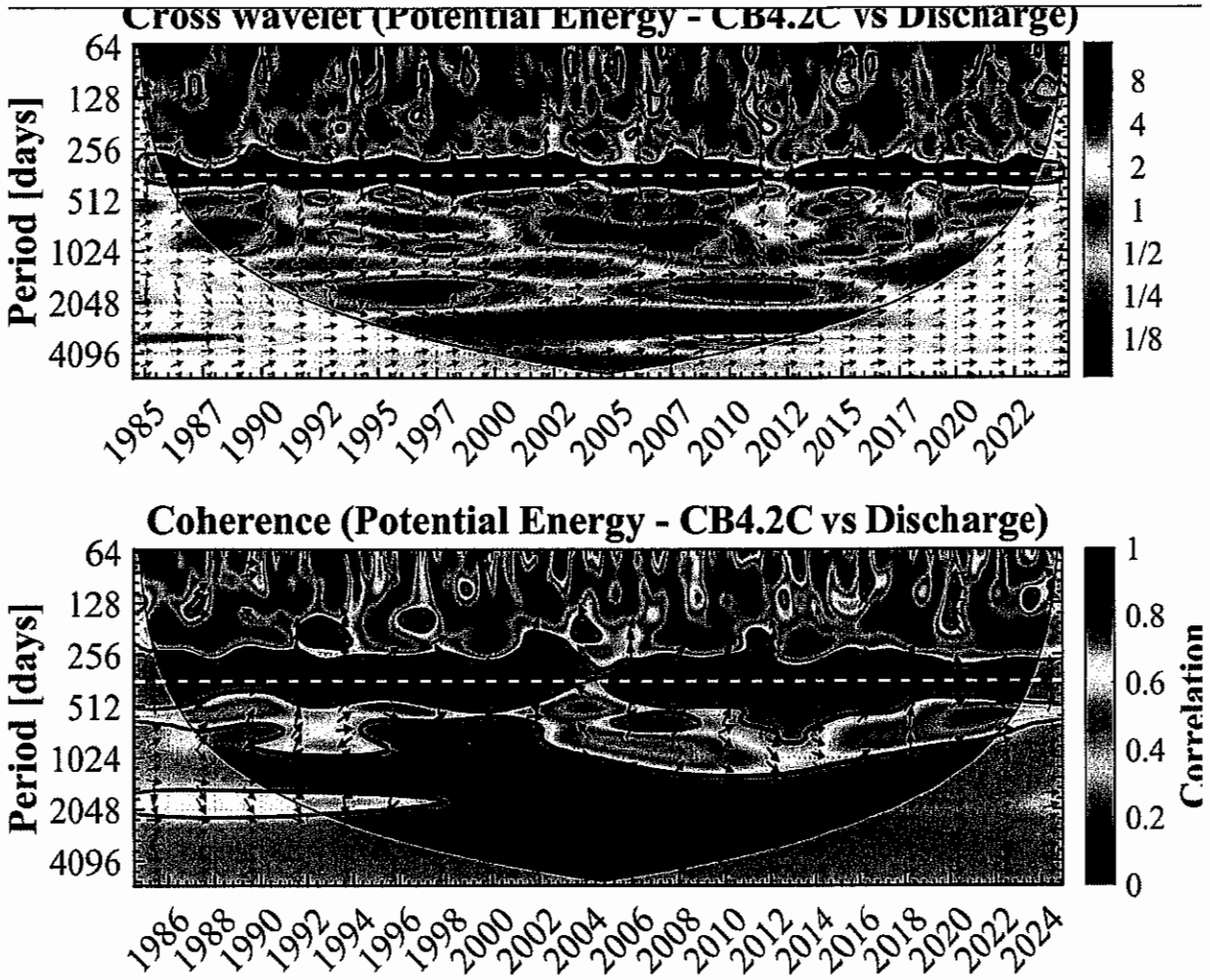


***Figure** 7. Cross-wavelet and wavelet coherence plots illustrate the relationship between Susquehanna River discharge and potential energy anomaly (stratification) at Station CB4.2C. Conditions are essentially the same for station CB4.3C. See Fig. 3 for explanation of plots.*

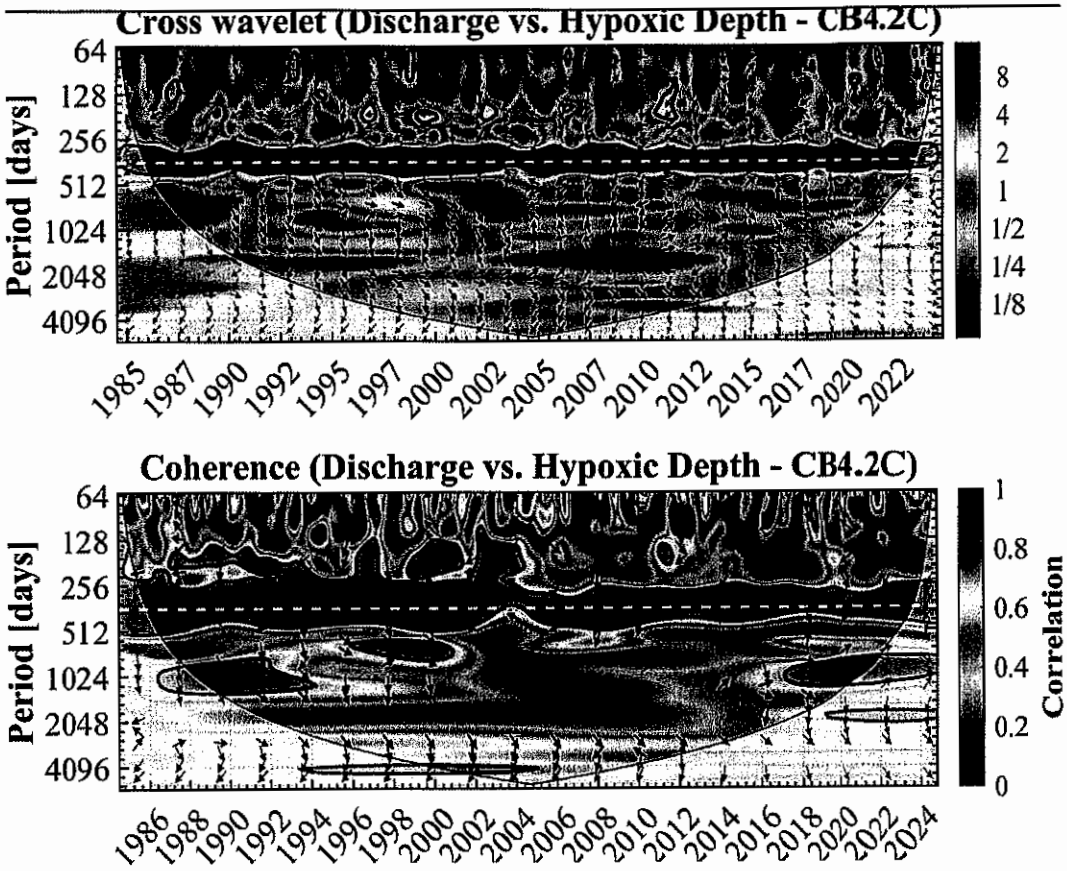


Figure 8. *Cross-wavelet and wavelet coherence plots illustrate the relationship between Susquehanna River discharge and hypoxic depth at Station CB4.2C. Conditions are essentially the same for station CB4.3C. See Fig. 3 for explanation of plots.*

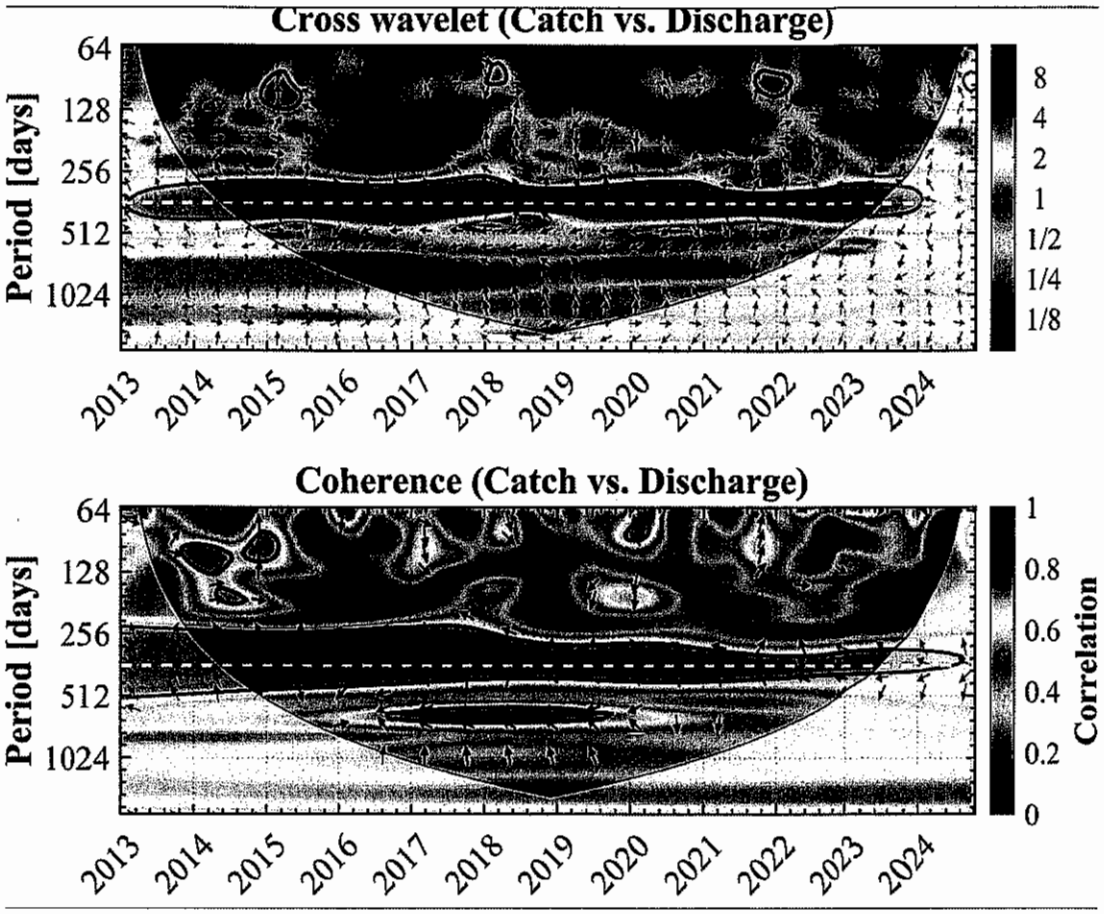
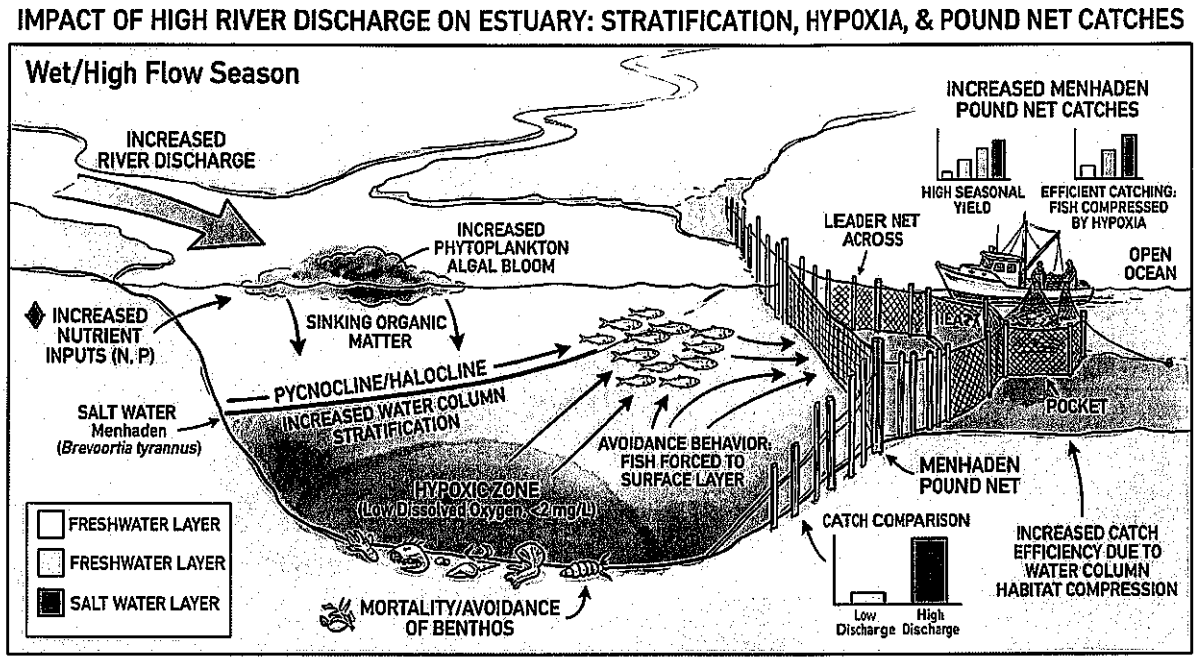


Figure 9. *Cross-wavelet and wavelet coherence plots illustrate the relationship between Susquehanna River discharge and Menhaden catches in Maryland (see Fig. 3 for explanation of plots).*

Summary

Results indicate that river discharge in the upper Chesapeake Bay relates to water column stratification in the middle bay, at periods of around 1 and 6 years. Results also show a relationship between river discharge and hypoxic depth at periods of 1 year. Moreover, water column stratification seems related to Menhaden catches. Furthermore, there seems to be a linkage between hypoxia depth and fish catches (and CPUE) in Maryland. In essence, increased discharge leads to increased water column stratification, enhanced hypoxia (decreased hypoxic depth), and reduced fish habitat with increased catches (Fig. 10).

Additional analyses could explore the linkage river discharge to nutrient concentrations to hypoxic depth to fish catch.



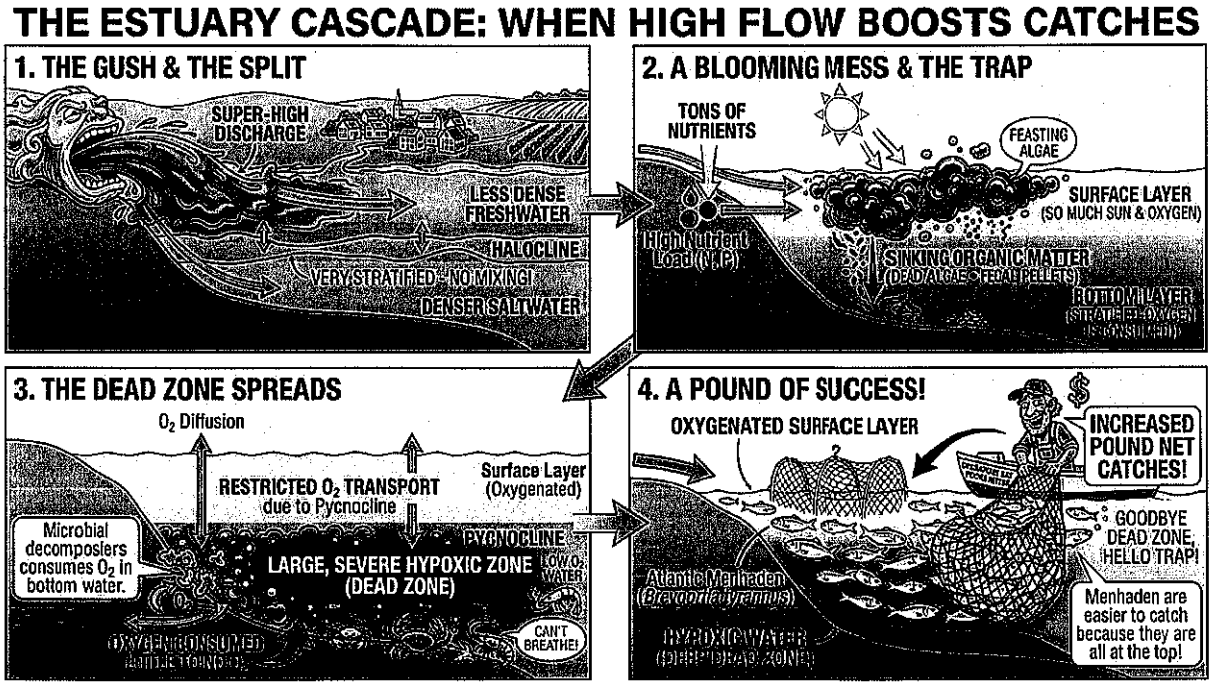


Figure 10. Schematics of the sequence of events suggested by the analyses described above.

Exhibit C

Doctor Arnoldo Valle-Levinson – Curriculum Vitae

University of Florida

Department of Civil and Coastal Engineering

365 Weil Hall

P.O. Box 116580

Gainesville, FL 32611

Phone: 352-359-0248

Fax: 352-392-3394

e-mail address: arnoldo@ufl.edu

EDUCATION

1985 B.S., Oceanology, Universidad Autónoma de Baja California, México

1988 M.S., Marine Environmental Sciences, SUNY at Stony Brook, NY.

1992 Ph.D., Oceanography, SUNY at Stony Brook, NY.

EXPERIENCE

1993-1995 Research Assistant Professor, Center for Coastal Physical Oceanography, Old Dominion University

1996-2000 Assistant Professor, Ocean, Earth and Atmospheric Sciences Department, Old Dominion University

1999 Adjunct Professor, Centro de Investigación Científica y de Educación Superior de Ensenada, México

2001-2005 Associate Professor, Ocean, Earth and Atmospheric Sciences Department, Old Dominion University

2005-2008 Associate Professor, Civil and Coastal Engineering Department, University of Florida

2008-Present Professor, Civil and Coastal Engineering Department, University of Florida

2010-Present Distinguished Professor, Universidad Catolica del Norte, Chile

2020-Present Program Officer, Physical Oceanography, National Science Foundation

PEER-REVIEWED PUBLICATIONS

1) Alvarez, L., A. Badan-Dangon and A. Valle. 1989. On coastal currents off Tehuantepec. Estuarine Coastal and Shelf Science, 29:89-96.

2) Swanson, R.L. and A. Valle-Levinson. 1990. Meteorological conditions that kept Long Island and New Jersey beaches free of floatables during the summer of 1989. Journal of Environmental Systems, 20(1):53-69.

3) Valle-Levinson, A. and R. L. Swanson 1991. Wind-induced scattering of medically-related and sewage-related items. Marine Technology Society Journal, 25 (2):49-56.

4) Valle-Levinson, A. and R.E. Wilson. 1994. Effects of tidal current amplitude on stratification and exchange in eastern Long Island Sound. J. Geophys. Res. 99(C6), 12,667-12,681.

5) Valle-Levinson, A. and R.E. Wilson. 1994. Effects of sill bathymetry, oscillating barotropic forcing, and vertical mixing on estuary/ocean exchange. J. Geophys. Res. 99(C3), 5,149-5,169.

6) Moraga, J., A. Valle-Levinson and J.L. Blanco. 1994. Hydrography and Dynamics of the Upper Layer in the Southeastern Pacific coastal Zone (30ES). Investigacion Pesquera (Chile). In Spanish. 38, 55-73.

7) Valle-Levinson, A. and K.M.M. Lwiza. 1995. Effects of channels and shoals on the exchange between the lower Chesapeake Bay and the adjacent ocean. J. Geophys. Res., 100(C9), 18,551-18,563.

8) Valle-Levinson, A. 1995. Observations of Barotropic and Baroclinic Exchange in the lower Chesapeake Bay. Continental Shelf Research, 15(13), 1,631-1,647.

9) Valle-Levinson, A., R. E. Wilson and R. L. Swanson. 1995. Physical mechanisms leading to hypoxia and anoxia in western Long Island Sound. Environment International, 21(5), 657-666.

10) Wheless, G.H., A. Valle-Levinson, and W. Sherman. 1995. Virtual Reality in Oceanography. Oceanography, 8(2), 52-58.

11) Paraso, M. and A. Valle-Levinson. 1996. Atmospheric forcing effects on sea level and water temperature in the lower Chesapeake Bay: 1992. Estuaries, 19(3), 548-561.

12) Miller, J.L. and A. Valle-Levinson. 1996. Effects of Chesapeake Bay Bridge Tunnel pilings on destratification in the lower Chesapeake Bay. Estuaries, 19(3), 526-539.

13) Wheless, G.H. and A. Valle-Levinson. 1996. A modeling study of tidally driven estuarine exchange through a narrow inlet onto a sloping shelf. J. Geophys. Res. 25,675-25,687.

14) Wheless, G.H., C.M. Lascara, A. Valle-Levinson, D.P. Brutzman, W. Sherman, W.L. Hibbard, and B. Paul. 1996. The Chesapeake Bay Virtual Environment: Initial results from the prototypical system. International Journal of Supercomputer Applications and High Performance Computing, 10(2/3), 199-210.

15) Wheless, G.H., C.M. Lascara, A. Valle-Levinson, D.P. Brutzman, W. Sherman, W.L. Hibbard, and B. Paul. 1996. Virtual Chesapeake Bay: interacting with a coupled physical/ biological model. IEE Computer Graphics and Applications, 16(4), 52-57.

16) Valle-Levinson, A. and J. O'Donnell. 1996. Tidal interaction with buoyancy driven flow in a coastal plain estuary. Coastal and Estuarine Studies volume 53, Buoyancy Effects on Coastal and Estuarine Dynamics, edited by David G. Aubrey and Carl T. Friedrichs, Am. Geophys. Union, Washington, DC., pp. 265-281.

17) Valle-Levinson, A., J.M. Klinck, and G.H. Wheless. 1996. Inflows/outflows at the transition between a coastal plain estuary and the coastal ocean. Continental Shelf Research. 16:1819-1847.

18) Valle-Levinson, A. and K.M.M. Lwiza. 1997. Bathymetric influences on the lower Chesapeake Bay hydrography. Journal of Marine Systems. 12, 221-236.

19) Boicourt, W.C., W. J. Wiseman, A. Valle-Levinson, and L.P. Atkinson, The continental shelf of the southeastern United States and Gulf of Mexico: Western Boundary Current proximity, in *The Sea: Volume 11 - The Global Coastal Ocean: Regional Studies and Synthesis*, edited by A.R. Robinson and K.H. Brink, John Wiley & Sons, Inc., Chapter 6, 135-182, 1998.

20) Valle-Levinson, A. and R.E. Wilson. Rotation and vertical mixing effects on exchange in eastern Long Island Sound. Estuarine, Coastal and Shelf Science, 46, 573-585, 1998.

21) Li, C.Y., A. Valle-Levinson, K.C. Wong, and K.M.M. Lwiza. Separating baroclinic flow from tidally induced flow in estuaries. Journal of Geophysical Research, 103(C5), 10,405-10,417, 1998.

22) Valle-Levinson, A., and K.M.M. Lwiza. Observations on the influence of downwelling winds on the Chesapeake Bay outflow, in Physics of Estuaries and Coastal Seas, edited by J. Dronkers and M. Scheffers, A.A. Balkema, Rotterdam, 247-256, 1998.

23) Valle-Levinson, C. Li, T. Royer, and L. Atkinson. Flow patterns at the Chesapeake Bay entrance. Continental Shelf Research, 18(10), 1157-1177, 1998.

24) Valle-Levinson, A., J,L. Miller, and G.H. Wheless. Enhanced stratification in the lower Chesapeake Bay following northeasterly winds. Continental Shelf Research, 18(13), 1631-1647, 1998.

25) Moraga, J., A. Valle-Levinson, and J. Olivares, Hydrography and geostrophy around Easter Island. Deep Sea Research, 46, 715-731, 1999.

26) Valle-Levinson, A. and L. Atkinson. Spatial gradients in the flow over an estuarine channel. Estuaries, 22(2A), 179-193, 1999.

27) Li, C., and A. Valle-Levinson, A 2-D analytic tidal model for a narrow estuary of arbitrary lateral depth variation: the intra-tidal motion, J. Geophys. Res, 104(C10), 23525-23543, 1999.

28) Valle-Levinson, A., K.C. Wong, and K.M.M. Lwiza, Fortnightly variability in the transverse dynamics of a coastal plain estuary, J. Geophys. Res, 105(C2), 3413-3424, 2000.

29) Valle-Levinson, A., C. Li, K. Wong, and K.M.M. Lwiza, Convergence of Lateral Flow Along a Coastal Plain Estuary, J. Geophys. Res., 105(C7), 17,045-17,061, 2000.

30) Valle-Levinson, A., J. Moraga, J. Olivares, and J. Blanco, Tidal and Residual Circulation in a Semiarid Bay: Coquimbo Bay, Chile, Continental Shelf Research, 20(15), 2009-2028, 2000.

31) Li, C., A. Valle-Levinson, L. Atkinson, and T.C. Royer, Inference of tidal elevation in shallow water using a vessel-towed ADCP, J. Geophys. Res., 105(C11), 26,225-26,236, 2000.

32) Valle-Levinson, A., F. Jara, C. Molinet, and D. Soto, Observations of Intratidal Variability of Exchange Flows Over a Sill/Contraction Combination in a Chilean Fjord, J. Geophys. Res., 106(C4), 7,051-7,064, 2001.

33) Valle-Levinson, A., K. Wong, and K. Bosley, Observations of the wind-induced exchange at the entrance to Chesapeake Bay, J. Mar. Res., 59(3), 391-416, 2001.

34) Valle-Levinson, A., J.A. Delgado, and L.P. Atkinson, Reversing Water Exchange Patterns at the Entrance to a Semiarid Coastal Lagoon, Estuar. Coast. Shelf Sci., 53, 825-838, 2001.

35) Locarnini, R., L. Atkinson, and A. Valle-Levinson, Real-time monitoring of mean temperature and salinity conditions at the Chesapeake Bay Mouth, Estuaries, 25(1), 1-5, 2002.

36) Wong, K. and A. Valle-Levinson, On the relative importance of the remote and local wind effects on the subtidal exchange at the entrance to the Chesapeake Bay, J. Mar. Res., 60, 477-498, 2002.

37) Valle-Levinson, A., M. Caceres, H.H. Sepulveda and K. Holderied, Flow patterns in the channels related to the mouth of Aysen Sound, Ciencia y Tecnologia del Mar (Chile, in Spanish), 25(2), 5-16, 2002.

38) Atkinson, L.P., A. Valle-Levinson, D.Figueroa, R. De Pol-Holz, V. A. Gallardo, W. Schneider, J.L. Blanco, and M. Schmidt, Oceanographic observations in Chilean coastal waters between Valdivia and Concepción, J. Geophys. Res., 107(C7), 10.1029/2001JC000991, 2002.

39) Valle-Levinson, A., K. Wong, and K. Bosley, Effects of Hurricane Floyd on the exchange at the Chesapeake Bay Entrance, Cont. Shelf Res., 22, 1715-1730, 2002.

40) Caceres, M. A. Valle-Levinson, H.H. Sepulveda, K. Holderied, Transverse variability of flow and density in a Chilean fjord, Cont. Shelf Res., 22, 1683-1698, 2002.

41) Valle-Levinson, A., and C.T. Friedrichs, Preface to Special Issue: Physics of Estuaries and Coastal Seas, Cont. Shelf. Res., 22 (11-13), 1561-1564, 2002.

42) Friedrichs, C.T. and A. Valle-Levinson, Preface to Special Issue: Physics of Estuaries and Coastal Seas, Volume II, Cont. Shelf. Res., 22 (18-19), 2611-2614, 2002.

43) Valle-Levinson, A., L. P. Atkinson, D. Figueroa, and L. Castro, Flow induced by upwelling winds in an equatorward facing bay: Gulf of Arauco, Chile, J. Geophys. Res., 108(C2), 3054, doi:10.1029/2001JC001272, 2003.

44) Cáceres, M., A. Valle-Levinson, and L. Atkinson, Observations of cross-channel structure of flow in an energetic tidal channel, J. Geophys. Res., 108(C4), 3114, doi:10.1029/2001JC000968, 2003.

45) Trasviña, A., G. Gutierrez, A. Valle-Levinson, M. Cosio, A. Mulhia, Hydrographic observations of the flow in the vicinity of a shallow seamount top in the Gulf of California, Estuar. Coast. Shelf Sci., 57, 1-2, 149-162, 2003.

46) Valle-Levinson, A. and T. Matsuno, Tidal and subtidal flows along an East China Sea cross-shelf transect, Journal of Oceanography, 59(5), 573-584, 2003.

47) Valle-Levinson, A., C. Reyes and R. Sanay, Effects of bathymetry, friction and Earth's rotation on estuary/ocean exchange, J. Phys. Oceanogr., 33(11), 2375-2393, 2003.

48) Valle-Levinson, A. and C. Brown, Subtidal variability of transverse flow off a cape, Ocean Dynamics, 53 (3), 166-175, 2003.

49) Valle-Levinson, A., and K. T. Bosley, Reversing circulation patterns in a tropical estuary, J. Geophys. Res., 108(C10), 3331, doi:10.1029/2003JC001786, 2003.

50) Valle-Levinson, A., W.C. Boicourt, and M. Roman, On the linkages among density, flow, and bathymetry gradients at the entrance to the Chesapeake Bay, Estuaries, 26(6), 1437-1449, 2003.

51) Sepulveda, A., A. Valle-Levinson and M. Framiñan, Observations of subtidal and tidal flows in the Rio de la Plata estuary, Cont. Shelf Res., 24(4-5), 509-525, doi:10.1016/j.csr.2003.12.002, 2004.

52) Li., C., A. Valle-Levinson, K.C. Wong, K. Lwiza and L. Atkinson, Estimation of drag coefficient by analytic assimilation of tidal velocity data from a vessel-towed ADCP, J. Geophys. Res., 109 (C3), C03034 10.1029/2003JC001991, 2004.

53) Cáceres, M. and A. Valle-Levinson, Transverse variability of flow on both sides of a sill/contraction combination in a fjord-like inlet of southern Chile, Estuar. Coast. Shelf Sci., 60, 325-338, 2004.

54) Valle-Levinson, A., A. Trasviña, G. Gutiérrez and R. González, Diurnal vertical motions over a seamount of the southern Gulf of California, J. Marine Systems, 50, 61-77, 2004.

55) Valle-Levinson, A. and J.L. Blanco, Observations of wind influence on exchange flows in a strait of the Chilean Inland Sea, J. Marine Research, 62(5), 721-741, 2004.

56) Valle-Levinson, A. et al., Observations of wind-induced exchange at the entrance to an equatorward facing embayment, Deep Sea Res. II, 51(20-21), 2371-2388, 2004.

57) Piñones, A., A. Valle-Levinson, D. Narvaez, C. Vargas, S. Navarrete, and J.C. Castilla, Wind-induced diurnal variability in river plume motion, *Estuar. Coast. Shelf Sci., 65(3)*, 513-525, 2005.

58) Hare J.A., Thorrold S., Walsh H., Reiss C., Valle-Levinson A., and Jones C. Bio-physical mechanisms of larval fish ingress into Chesapeake Bay, *Mar. Ecol. Prog. Ser., 303*, 295-310, 2005.

59) Sanay, R. and A. Valle-Levinson, Wind-induced circulation in semienclosed homogeneous, rotating basins, *J. Phys. Oceanogr., 35*, 2520-2531, 2005.

60) Yannicelli, B., L. R. Castro, A. Valle-Levinson, L. Atkinson, and D. Figueroa, Vertical distribution of decapod larvae in the entrance of an equatorward facing bay of central Chile: implications for transport, *J. Plankton Res., 28(1)*, 19-37; doi:10.1093/plankt/fbi098, 2006.

61) Valle-Levinson, A. and J. Moraga, Observations of bipolar residual circulation in two equatorward-facing semiarid bays, Cont. Shelf Res., 26, 179-193, 2006.

62) Stacey, M. and A. Valle-Levinson, Simulation and energy partition of the flow through Paso Galvarino, Chile, J. Mar. Res., 64(2), 249-266, 2006.

63) Valle-Levinson, A., J.L. Blanco and M. Frangopulos, Hydrography and frontogenesis in a glacial fjord off the Strait of Magellan. *Ocean Dynamics*, 56, 217-227, DOI: 10.1007/s10236-005-0048-8, 2006.

64) Caceres, M., A. Valle-Levinson, C. Molinet, M. Castillo, M. Bello, C. Moreno, Lateral variability of flow over a sill in a channel of southern Chile. *Ocean Dynamics*, 56, 352-359, DOI: 10.1007/s10236-006-0077-y, 2006.

65) Molinet C, Valle-Levinson A, Moreno CA, Cáceres M, Bello M, Castillo M., Effects of sill processes on the distribution of epineustonic competent larvae in a stratified system of Southern Chile, Mar. Ecol. Prog. Ser., 324:95-104, 2006.

66) Kumar, A., A. Valle-Levinson and L. Atkinson, Observation of shelfwater overrunning the southern slope sea. *Progress in Oceanography, 70*, 213-232, 2006.

67) Huijts, K.M.H., H.M. Schuttelaars, H.E. de Swart, A. Valle-Levinson, Lateral entrapment of sediment in tidal estuaries: an idealized model study, *J. Geophys Res.,* Vol. 111, C12016, doi:10.1029/2006JC003615, 2006.

68) Guo, X. and A. Valle-Levinson, Tidal effects on estuarine circulation in Chesapeake Bay, *Continental Shelf Research, 27*, 20-42, 2007.

69) Valle-Levinson, A., N. Sarkar, R. Sanay, D. Soto and J. León, Spatial structure of hydrography and flow in a Chilean Fjord, Estuario Reloncaví, *Estuaries and Coasts, 30(1)*, 113-126, 2007.

70) Valle-Levinson, A., J.L. Blanco, and M. Frangopulos, Depth-dependent overtides from internal tide reflection in a glacial fjord, *Estuaries and Coasts, 30(1)*, 127-136, 2007.

71) Guo, X, and A. Valle-Levinson, Estuarine circulation and wind-driven currents, *Bulletin on Coastal Oceanography*, in Japanese, *44(2)*, 117-127, 2007.

72) Valle-Levinson, A., K. Holderied, C. Li, and R. Chant, Subtidal flow structure at the turning region of a wide outflow plume, J. Geophys. Res., 112, C04004, doi:10.1029/2006JC003746, 2007.

73) Cáceres, M., A. Valle-Levinson, J. Fierro, M. Bello, M. Castillo, Características del flujo residual en canales Pulluche y Chacabuco, Ciencia y Tecnología del Mar, 30(2), 17-36, 2007.

74) Webb, B., J.L. King, B. Tutak and A. Valle-Levinson, Flow structure at a trifurcation near a North Florida Inlet, Continental Shelf Research, 27(10-11), 1528-1547, doi: 10.1016/j.csr.2007.01.021, 2007.

75) Valle-Levinson, A., Density-driven exchange flow in terms of the Kelvin and Ekman numbers, J. Geophys. Res., 113, C04001, doi:10.1029/2007JC004144, 2008.

76) Salas-Monreal, D. and A. Valle-Levinson, Sea level slopes and volume fluxes produced by atmospheric forcing in estuaries: Chesapeake Bay by case, J. Coastal Res., 24(2B), 208-217, 2008.

77) Caliskan, H. and A. Valle-Levinson, A., Wind-wave transformations in an elongated bay, Cont. Shelf Res., 28(14), 1702-1710, 2008.

78) Framiñan, M. B., A. Valle-Levinson, H. H. Sepulveda, and O. B. Brown, Tidal variations of flow convergence, shear, and stratification at the Rio de la Plata estuary turbidity front, J. Geophys. Res., 113, C08035, doi:10.1029/2006JC004038, 2008.

79) Narváez, D. A., and A. Valle-Levinson, Transverse structure of wind-driven flow at the entrance to an estuary: Nansemond River, J. Geophys. Res., 113, C09004, doi:10.1029/2008JC004770, 2008.

80) Guo, X. and A. Valle-Levinson, Lateral structure of wind effects on density-driven flow in the Chesapeake Bay, Cont. Shelf. Res., 28, 2450-2471, 2008.

81) Murphy, P. and A. Valle-Levinson, Tidal and residual circulation in St. Andrew Bay, Cont. Shelf. Res., 28(19), 2678-2688, 2008.

82) Cáceres, M., A. Valle-Levinson and M. Bello, Residual flow over a bump in Quellon Bay, Revista de Biología Marina y Oceanografía, 43(3), 2008.

83) Valle-Levinson, A., G. Gutierrez de Velasco, A. Trasviña, A.J. Souza, R. Durazo, A. J. Mehta, Residual exchange flow in subtropical estuaries, Estuaries and Coasts, 32:54–67, doi:10.1007/s12237-008-9112-1, 2009.

84) Cheng, P. and A. Valle-Levinson, Spatial variations of flow structure over estuarine hollows, Continental Shelf Research, 29, 927-937, 2009.

85) Salas-Monreal, D. and A. Valle-Levinson, Continuously stratified flow dynamics over a hollow, Journal of Geophysical Research, 114, C03021, doi:10.1029/2007JC004648, 2009.

86) Cheng, P. and A. Valle-Levinson, Influence of lateral advection on residual currents in microtidal estuaries, J. Phys. Oceanogr., 39, 3177-3190, 2009.

87) Murphy, P., A. Waterhouse, A. Penko, T. Hesser and A. Valle-Levinson, Subtidal flow and its variability at the entrance to a subtropical lagoon, Cont. Shelf Res., 29, 2318-2332, 2009.

88) Waterhouse, A. and A. Valle-Levinson, Subtidal flow in a weakly stratified subtropical tidal inlet, Cont. Shelf. Res., 30, 281-292, 2010.

89) Valle-Levinson, A. Definition and classification of estuaries, in: Contemporary Issues in Estuarine Physics, Edited by A. Valle-Levinson, Cambridge University Press, Cambridge, UK, 2010, pp. 1-11.

90) Contemporary Issues in Estuarine Physics, Edited by A. Valle-Levinson, Cambridge University Press, Cambridge, UK, 2010, 326 pp.

91) Valle-Levinson, A., X. Guo, Asymmetries in tidal flow over a Seto Inland Sea scour pit, J. Marine Research., 67(5), 619-635, 2009.

92) Reyes, A.C. and A. Valle-Levinson, Wind modifications to density-driven flows in semienclosed, rotating basins, J. Physical Oceanography, 40, 1473-1487, 2010.

93) Cheng, P., A. Valle-Levinson, C.W. Winant, A. Ponte, G. Gutierrez, K. Winters, Upwelling-enhanced seasonal stratification in a semiarid bay, Continental Shelf Research, 30,1241-1249, 2010.

94) Cheng, P., A. Valle-Levinson and H. deSwart, Residual currents induced by asymmetric tidal mixing in weakly stratified narrow estuaries, J. Phys. Oceanogr., 40, 2135-2147, 2010.

95) Pérez-Santos, I., W. Schneider, M. Sobarzo, R. Montoya-Sánchez, A. Valle-Levinson, and J. Garcés-Vargas (2010), Surface wind variability and its implications for the Yucatan basin-Caribbean Sea dynamics, J. Geophys. Res., 115, C10052, doi:10.1029/2010JC006292.

96) Safak, I, A. Sheremet, A. Valle-Levinson, A.F. Waterhouse, Variation of overtides by wave enhanced bottom drag in a North Florida tidal inlet, Cont. Shelf Res., 30, 1963-1970, 2010.

97) Diaz, P., C. Molinet, M. Caceres, A. Valle-Levinson, Seasonal and intratidal distribution of *Dinophysis spp.* in a Chilean fjord, Harmful Algae, 10, 155-164, 2011.

98) Cheng, P., A. Valle-Levinson and H. deSwart, A numerical study of residual currents induced by asymmetric tidal mixing in narrow estuaries, J. Geophysical Research., 116, C01017, doi:10.1029/2010JC006137, 2011.

99) Torres, R., M. Frangopulos, M. Hamame, V. Montecino, C. Maureira, G. Pizarro, B. Reid, A. Valle-Levinson, J. L. Blanco, Nitrate to silicate ratio variability and the composition of micro-phytoplankton blooms in the inner-fjord of Seno Ballena (Strait of Magellan, 54S), Continental Shelf Research, 31(3-4), 244-253, DOI: 10.1016/j.csr.2010.07.014, 2011.

100) Valle-Levinson, A., I. Mariño, C. Enriquez, A. Waterhouse, Tidal variability of salinity and velocity fields related to intense point source submarine groundwater discharges into the coastal ocean, Limnology and Oceanography, 56: 1213-1224, 2011.

101) Waterhouse, A., A. Valle-Levinson and C.D. Winant, Tides in a system of connected estuaries, J. Phys. Oceanogr., 41, 946-959, 2011.

102) Moraga, J., A. Valle-Levinson, M. Ramos, M. Pizarro-Koch, Upwelling-triggered near-geostrophic recirculation in an equatorward facing embayment, Continental Shelf Research, 31,1991-1999, DOI 10.1016/j.csr.2011.10.002, 2011.

103) Valle-Levinson A. Classification of Estuarine Circulation. In: Wolanski E and McLusky DS (eds.) Treatise on Estuarine and Coastal Science, Vol 1, pp. 75–86. Waltham: Academic Press, 2011.

104) Valle-Levinson A. Large Estuaries (Effects of Rotation). In: Wolanski E and McLusky DS (eds.) Treatise on Estuarine and Coastal Science, Vol 2, pp. 123–140. Waltham: Academic Press, 2011.

105) Shaha, D.C., Y-K. Cho, T-W. Kim, and A. Valle-Levinson, Spatio-Temporal Variation of Flushing Time in the Sumjin River Estuary, Terr. Atmos. Ocean. Sci., 23(1), 2012.

106) Valle-Levinson, A., Impact of record flooding of a subtropical river on estuary/ocean exchange, Ocean Dynamics, 62(1), 77-85, DOI 10.1007/s10236-011-0491-7, 2012.

107) Ponte, A., G. Gutierrez, A. Valle-Levinson, C. Winant, and K. Winters, Wind-Driven Subinertial Circulation inside a Semienclosed Bay in the Gulf of California, J. Phys. Oceanogr., 42, 940-955, DOI: 10.1175/JPO-D-11-0103.1, 2012.

108) Lee, J. and A Valle-Levinson, Influence of bathymetry on hydrography and circulation at the region between an estuary mouth and the adjacent continental shelf. Cont. Shelf Res., 41, 77-91, 2012.

109) Cho, K-H, H.V. Wang, J. Shen, A. Valle-Levinson, Y.-c. Teng, A modeling study on the response of Chesapeake Bay to hurricane events of Floyd and Isabel. Ocean Modelling, 49-50, 22-46, 2012.

110) Basdurak, N. B. and A. Valle-Levinson, Influence of Advective Accelerations on Estuarine Exchange at a Chesapeake Bay Tributary, J. Phys. Oceanogr. 42(10), 1617-1634, doi:10.1175/JPO-D-11-0134.1, 2012.

111) Waterhouse, A., A. Valle-Levinson and R. Morales-Perez, Tidal asymmetries in velocities and stratification over a bathymetric depression in a tropical inlet, Cont. Shelf Res., 48, 87-99, 2012.

112) Arnott, K., A. Valle-Levinson and M. Luther, Friction-Dominated Exchange in a Florida Estuary, Estuar. Coast. Shelf Sci., 113, 248-258, 2012.

113) Reyes-Hernandez, C. and A. Valle-Levinson, Fortnightly variations of the lateral structure of flow and hydrography at the Chesapeake Bay entrance, Cont. Shelf Res., 52, 46-61, http://dx.doi.org/10.1016/j.csr.2012.10.004, 2013.

114) Pérez-Santos, I., J. Garcés-Vargas, W. Schneider, S. Parra, L. Ross & A. Valle-Levinson Doble difusión a partir de mediciones de microestructura en canales y fiordos de la Patagonia Central (47.85°S) (Chile), *Latin American Journal of Aquatic Research* , 41(1), 177-181, 2013.

115) Lee,* J., B. Webb, K. Park, B. Dzwonkowski and A. Valle-Levinson, Bathymetric influences on tidal currents at the entrance to a highly stratified, shallow estuary, *Cont. Shelf Res.*, 58, 1-11, 2013.

116) Expósito-Díaz, G., M.A. Monreal-Gómez, A. Valle-Levinson and D.A. Salas de León, Tidal variations of turbulence at a spring discharging to a tropical estuary, *Geophysical Research Letters*, 40, 898-903, doi:10.1002/grl.50194, 2013.

117) Lee*, J., and A. Valle-Levinson, Bathymetric effects on estuarine plume dynamics, J. Geophys. Res. Oceans, 118, 1969–1981, doi:10.1002/jgrc.20119, 2013.

118) Bravo, L., M. Ramos, M. Sobarzo, O. Pizarro, and A. Valle-Levinson, Barotropic and baroclinic semidiurnal tidal currents in two contrasting coastal upwelling zones of Chile, J. Geophys. Res. Oceans, 118, 1226–1238, doi:10.1002/jgrc.20128, 2013.

119) Basdurak*, B. and A. Valle-Levinson, Tidal variability of lateral advection in a coastal plain estuary, *Cont. Shelf Res.*, 61-62, 85-97, 2013.

120) Cheng, P., H. E. de Swart, and A. Valle-Levinson, Role of asymmetric tidal mixing in the subtidal dynamics of narrow estuaries, J. Geophys. Res. Oceans, 118, 2623-2639, doi:10.1002/jgrc.20189, 2013.

121) Serrano, D., E. Ramírez-Félix and A. Valle-Levinson, Tidal hydrodynamics in a two-inlet coastal lagoon in the Gulf of California, *Cont. Shelf Res.*, 63,1-12, 2013.

122) Valle-Levinson, A., M. Olabarrieta, and A. Valle, Semidiurnal perturbations to the surge of Hurricane Sandy, *Geophysical Research Letters*, 40, 2211-2217, doi:10.1002/grl.50461, 2013.

123) Basdurak*, N.B., A. Valle-Levinson and P. Cheng, Lateral structure of tidal asymmetry in vertical mixing and its impact on exchange flow in a coastal plain estuary, *Cont. Shelf Res.*, 64, 20-32. 2013.

124) Winant*, C.D., A. Valle-Levinson, A. Ponte, C.D. Winant, G. Gutierrez de Velasco, K. Winters, Observations on the lateral structure of wind-driven flows in a stratified, semiarid bay of the Gulf of California, Estuaries and Coasts, 37, 1319-1328, doi: 10.1007/s12237-013-9641-0, 2013.

125) Waterhouse, A., B. Tutak, A. Valle-Levinson, P. Sheng, Influence of two tropical storms on the residual flow in a subtropical tidal inlet, Estuaries and Coasts, 36, 1037-1053, doi: 10.1007/s12237-013-9606-3, 2013.

126) Olascoaga M. J., F. J. Beron-Vera, G. Haller, J. Triñanes, M. Iskandarani, E. F. Coelho, B. Haus, H. S. Huntley, G. Jacobs, A. D. Kirwan, Jr., B. L. Lipphardt, Jr., T. Ozgokmen, A. J. H. M. Reniers and A. Valle-Levinson. Drifter motion in the Gulf of Mexico constrained by altimetric Lagrangian Coherent Structures , Geophysical Research Letters, 40, 1–5, doi:10.1002/2013GL058624, 2013.

127) Dzwonkowski,B., K. Park, J. Lee, B.M. Webb, A.Valle-Levinson, Spatial variability of flow over a river-influenced inner shelf in coastal Alabama during spring, Cont. Shelf Res., 74, 25-34. 2014.

128) Appendini, C.M., A. Pedrozo-Acuña, A. Valle-Levinson. Storm surge at a western Gulf of Mexico site: variations on Tropical Storm Arlene. The International Journal of River Basin Management, 12(4), 403-410, DOI: 10.1080/15715124.2014.880709, 2014.

129) Valle-Levinson, A., M. Caceres, O. Pizarro. Variations of tidally driven three-layer residual circulation in fjords. Ocean Dynamics, 64, 459–469, 2014.

130) Stanev, E. V., R. Al-Nadhairi, J. Staneva, J. Schulz-Stellenfleth, and A. Valle-Levinson, Tidal wave transformations in the German Bight, Ocean Dynamics, 64:951–968, 2014.

131) Pérez-Santos, I., W. Schneider, A. Valle-Levinson, J. Garcés-Vargas, I. Soto, R. Montoya-Sánchez, N. Melo González, and F. Müller-Karger. Chlorophyll-a patterns and mixing processes in the Yucatan Basin, Caribbean Sea. Ciencias Marinas, 40(1), 11-31, 2014.

132) Cerralbo, P., Grifoll, M., Valle-Levinson, A., Espino, M. Tidal Transformation and Resonance in a Short, Microtidal Mediterranean Estuary (Alfacs Bay in Ebre Delta), Estuar. Coast. Shelf Sci., 145, 57-68, 2014.

133) Yang, Z., H.E. de Swart, H. Cheng, C. Jiang, A. Valle-Levinson, Modelling lateral entrapment of suspended sediment in estuaries: The role of spatial lags in settling and M4 tidal flow. Continental Shelf Research, 85, 126–142, 2014.

134) Parra*, S., I. Mariño, C. Enriquez, A. Valle-Levinson. Variations in turbulent kinetic energy at a point-source submarine groundwater discharge in a reef lagoon, Ocean Dynamics, 64, 1601-1614, 2014.

135) Henrie*, K. and A. Valle-Levinson, Subtidal variability in water levels inside a subtropical estuary. J. Geophys. Res., Oceans, 119 (11), 7483-7492, doi:10.1002/2014JC009829, 2014.

136) Pérez, I., J. Garcés-Vargas, W. Schneider, L. Ross*, S. Parra*, and A. Valle-Levinson. Double-diffusive layering and mixing in Patagonian fjords, Progress in Oceanography, 129, 35-49, 2014.

137) Ross*, L. I. Perez, A. Valle-Levinson, W. Schneider, Semidiurnal internal tides in a Patagonian fjord, Progress in Oceanography, 129, 19-34, 2014.

138) Valle-Levinson, A. L. Castro, M. Caceres, and O. Pizarro. Twilight vertical migrations of zooplankton in a Chilean fjord, Progress in Oceanography, 129, 114-124, 2014.

139) Li, M., P. Cheng, R. Chant, A. Valle-Levinson, K. Huguenard, Analysis of vortex dynamics of lateral circulation in a straight tidal estuary. J. Phys. Oceanogr.,44 (10), 2779-2795, 2014.

140) Jacobs, G.A., B. Bartels, D. Bogucki, F. Javier Beron-Vera, S. Chen, E.F. Coelho, M. Curcic, A. Griffa, M. Gough, B.K. Haus, A.C. Haza, R.W. Helber, P.J. Hogan, H. Huntley, M. Iskandarani, F. Judt, A. D. Kirwan Jr, N. Laxague, A. Valle-Levinson, B. Lipphardt, A. Mariano, H.E. Ngodock, G. Novelli, M. J. Olascoaga, T.M. Ozgokmen, A.C. Poje, A.J.H.M. Reniers, C.D. Rowley, E.H. Ryan, S.R. Smith, P.L. Spence, P.G. Thoppil1, M.Wei, Data assimilation considerations for improved ocean predictability during the Gulf of Mexico Grand Lagrangian Deployment (GLAD), Ocean Modelling, 83, 98-117, 2014.

141) Stanev, E.V., R. Al-Nadhairi, A. Valle-Levinson, The role of density gradients in tidal asymmetries in the German Bight, Ocean Dynamics, DOI 10.1007/s10236-014-0784-8, 2015.

142) Salles, P., A. Valle-Levinson, Sottolichio, A., N. Senechal. Wind-driven modifications to the residual circulation in an ebb-tidal delta: Arcachon Lagoon, Southwestern France, J. Geophys. Res. Oceans, 120, doi: 10.1002/2014JC010311, 2015.

143) Valle-Levinson, A., K. Huguenard, L. Ross, J. Branyon*, J. MacMahan, A. Reniers, Tidal and nontidal exchange at a subtropical inlet: Destin Inlet, Northwest Florida, Estuar. Coast. Shelf Sci., 155, 137-147, 2015.

144) Coelho E.F., P. Hogan, G. Jacobs, P. Thoppil, H.S. Huntley, B.K. Haus, B.L. Lipphardt Jr., A.D. Kirwan Jr. E.H. Ryan, J. Olascoaga, F. Beron-Vera, A.C. Poje, A. Griffa, T.M. Özgökmen, A.J. Mariano, G. Novelli, A.C. Haza, D. Bogucki, S.S. Chen, M. Curcic, M. Iskandarani, F. Judt, N. Laxague, A.J.H.M. Reniers, A. Valle-Levinson, M. Wei, Ocean current estimation using a Multi-Model Ensemble Kalman Filter during the Grand Lagrangian Deployment experiment (GLAD), Ocean Modelling, 87, 86-106, 2015.

145) Parra, S.M., A. Valle-Levinson, I. Mariño-Tapia, C. Enriquez, Salt intrusion at a submarine spring in a fringing reef lagoon, J. Geophys. Res. Oceans, 120, doi: 10.1002/2014JC010459, 2015.

146) Barton, E.D., Largier, J.L., Torres, R., Sheridan, M., Trasviña, A., Souza, A., Pazos, Y., Valle-Levinson, A. Coastal upwelling and downwelling forcing of circulation in a semi-enclosed bay: Ria de Vigo, Progress in Oceanography, 134, 173-189, 2015.

147) Huguenard, K. D., A. Valle-Levinson, M. Li, R. J. Chant, and A. J. Souza, Linkage between lateral circulation and near-surface vertical mixing in a coastal plain estuary, J. Geophys. Res. Oceans, 120, doi:10.1002/2014JC010679, 2015.

148) Ross, L., A. Valle-Levinson, I. Perez-Santos, F.J. Tapia, W. Schneider, Baroclinic annular variability of internal motions in a Patagonian Fjord, J. Geophys. Res. Oceans, 120, doi: 10.1002/2014JC010669, 2015.

149) Valle-Levinson, A., C.A.F. Schettini, Fortnightly switching of residual flow drivers in a tropical semiarid estuary, Estuar. Coast. Shelf Sci., 169, 46-55, 2016.

150) Tenorio, L., J. Gomez, C. Enriquez, I. Mariño, A. Valle-Levinson, S. Parra, Tidal variations in a highly frictional tropical lagoon, Cont. Shelf Res., 114,16-28, 2016.

151) Feng, X., M. Olabarrieta, A. Valle-Levinson, Storm induced Semidiurnal Perturbations to Surges on the US Eastern Seaboard, Cont. Shelf Res., 114, 54-71, 2016.

152) Parra, S., A. Valle-Levinson, I. Mariño-Tapia, C. Enriquez, J. Candela, J. Sheinbaum, Seasonal variability of saltwater intrusion at a point-source submarine groundwater discharge, Limnol. Oceanogr., doi:10.1002/lno.10286, 2016.

153) Mariano, A. J., et al., Statistical properties of the surface velocity field in the northern Gulf of Mexico sampled by GLAD drifters, J. Geophys. Res. Oceans, 121, 2016, 5193–216, doi:10.1002/2015JC011569.

154) Schettini, C.A.F., J.B. de Miranda, A. Valle-Levinson, E.C. Truccolo, E.C. Dominguez, The circulation of the lower Capibaribe estuary (Brazil) and its implications on the transport of scalars. Brazilian Journal of Oceanography. 64(3):263-276, 2016.

155) Mehler, K., Burlakova, L.E., Karatayev, A. Y., Biesinger, Z., Valle-Levinson, A., Castiglione, C. and D. Gorsky, Sonar technology and underwater imagery analysis can enhance invasive *Dreissena* distribution assessment in large rivers, Hydrobilogia, 2016, doi: 10.1007/s10750-016-3040-z

156) Kaplan, D., M. Olabarrieta, P. Friedrick, A. Valle-Levinson, Freshwater Detention by Oyster Reefs: Quantifying a keystone ecosystem service, 11(12), 2016: e0167694. doi:10.1371/journal.pone.0167694.

157) Costa, M.B., E.C. Macedo, A. Valle-Levinson, E. Siegle, Wave and tidal flushing in a near-equatorial mesotidal atoll, Coral Reefs, 2016, doi:10.1007/s00338-016-1525-x

158) Biancamaria,S., F. Frappart, A-S Leleu, V. Marieu, D. Blumstein, J-D Desjonquères, F. Boy, A. Sottolichio, A. Valle-Levinson, Satellite radar altimetry water elevations performance over a 200 m wide river: evaluation over the Garonne River, Advances in Space Research, 59, 128-146, 2017, doi:10.1016/j.asr.2016.10.008

159) Schettini, C.A.F., A. Valle-Levinson, E. Truccolo, Circulation and transport in short, low-inflow estuaries under anthropogenic stresses, Regional Studies in Marine Science, 10,52-64, 2017.

160) Mehler, K., Burlakova, L.E.., Karatayev, A. Y., Biesinger, Z., Bruestle, E., Valle-Levinson, A., Castiglione, C. and D. Gorsky, Integrating remote sensing and species

distribution modeling to predict benthic communities in a Great Lakes connecting channel, River Research and Applications, 1-9, 2017, DOI: 10.1002/rra.3169.

161) Olabarrieta, M., A. Valle-Levinson, C.J. Martinez, C. Pattiaratchi, L. Shi, Meteotsunamis in the northeastern Gulf of Mexico and their possible link to El Niño Southern Oscillation, Nat Hazards, 2017, DOI 10.1007/s11069-017-2922-3.

162) Basdurak, N.B., K. Huguenard, A. Valle-Levinson, M. Li, R. Chant, Parameterization of mixing by secondary circulation in estuaries, J. Geophys Res, Oceans, 122, 5666-5688, 2017, doi:10.1002/2016JC012328

163) Valle-Levinson, A., A. Dutton, and J. B. Martin, Spatial and temporal variability of sea level rise hot spots over the eastern United States, Geophys. Res. Lett., 44, 2017, doi:10.1002/2017GL073926.

164) Ross, L., A. Valle-Levinson, A. Sottolichio, N. Huybrechts, Lateral variability of subtidal flow at the mid-reaches of a macrotidal estuary, J. Geophys. Res., Oceans, 122, doi:10.1002/2016JC012504, 2017.

165) Ross, L., H. de Swart, E. Ensing, and A. Valle-Levinson, Three dimensional tidal flow in a fjord-like basin with converging width: An analytical model, J. Geophys. Res.Oceans, 122, doi:10.1002/ 2017JC012820, 2017.

166) Li, M., W. Liu, R. Chant, A. Valle-Levinson, Flood-ebb and spring-neap variations of lateral circulation in the James River Estuary. Cont. Shelf. Res. 148, 9-18, 2017.

167) Young, C., J.B. Martin, A. Pain, J. Branyon, A. Valle-Levinson, I. Marino, M. Rebolledo, Effects of short-term variations in sea level on dissolved oxygen in a coastal karst aquifer, Quintana Roo, Mexico, Limnology & Oceanography, 63, 352-362, doi: 10.1002/lno.10635, 2018.

168) Tenorio-Fernandez, L. A.Valle-Levinson, J. Gomez-Valdes. Subtidal hydrodynamics in a tropical lagoon: A dimensionless numbers approach. Estuar. Coast. Shelf Sci., 200, 450-459, 2018.

169) Pein, J. A. Valle-Levinson, E. Stanev, Secondary circulation asymmetry in a meandering, partially stratified estuary J. Geophys. Res., Oceans, 123. https://doi.org/10.1002/2016JC012623, 2018.

170) Valle-Levinson, A., E. Stanev, T. Badewien. Tidal and subtidal exchange flows at an inlet of the Wadden Sea. Estuar. Coast. Shelf Sci., 202, 270-279, 2018.

171) Fei Y., Y.J. Zhang, H.V. Wang, M.A.M. Friedrichs, I.D. Irby, E. Alteljevich, A. Valle-Levinson, Z. Wang, H. Huang, J. Shen, J. Du, A 3D unstructured-grid model for Chesapeake Bay: Importance of bathymetry. Ocean Modelling, 127, 16-39, 2018.

172) Kourafalou, V., I. Androulidakis, R. Smith, A. Valle-Levinson. Physical connectivity between Pulley Ridge and Dry Tortugas coral reefs under the influence of the Loop

Current/Florida Current system. Progress in Oceanography165, 75-99, https://doi.org/10.1016/j.pocean.2018.05.004, 2018.

173) Aguiar, A. M. Cirano, M. Marta-Almeida. G.C. Lessa, A. Valle-Levinson, Upwelling processes along the South Equatorial Current bifurcation region and the Salvador Canyon (13°S), Brazil. Continental Shelf Research, 171, 77-96, 2018.

174) Perales-Valdivia, H., R. Sanay-González, A. Valle-Levinson, Effects of tides, wind and river discharge on the salt intrusion in a microtidal tropical estuary, Regional Studies in Marine Science, 24, 400-410, https://doi.org/10.1016/j.csr.2018.10.001, 2018.

175) Liu, W., M. Li, R. Chant, E. Hunter, A. Valle-Levinson, Time and Scale Dependence in Estuarine Longitudinal Dispersion, J. Geophys. Res., Oceans, 123, 8792–8811. https://doi.org/10.1029/ 2017JC013397, 2018.

176) Cerralbo, P., M. Espino, M. Grifoll, A. Valle-Levinson, Subtidal circulation in a microtidal Mediterranean bay, Scientia Marina, 82(4), 231-243, DOI : 10.3989/scimar.4801.16A, 2018.

177) Guerra-Chanis, G., M. Diez-Minguito, A. Valle-Levinson, M.A. Reyes-Merlo, Saltwater intrusion in a subtropical estuary, Estuarine Costal and Shelf Science, 217, 28-36, 2019.

178) Aguiar, A.L., A. Valle-Levinson, M. Cirano, M. Marta-Almeida, G.C. Lessa, J.F. Paniagua-Arroyave. Ocean-estuary exchange variability in a large tropical estuary. Continental Shelf Research, 172, 33-49, 2019.

179) Juarez, B., A. Valle-Levinson, R. Chant, M. Li. Observations of the lateral structure of wind-driven flow in a coastal plain estuary, Estuar. Coast Shelf Sci., 217, 262-270, https://doi.org/10.1016/j.ecss.2018.11.018, 2019.

180) Salas-Monreal, D., A. Valle-Levinson, G. E. Athie de Velasco, Flow modifications over a tropical coral reef system, Estuar. Coast. Shelf Sci., 217, 271-280, https://doi.org/10.1016/j.ecss.2018.11.029, 2019.

181) Lee, J., B.M. Webb, B. Dzwonkowski, A. Valle-Levinson, J. Lee, Characteristics of exchange flow in a multiple inlet diurnal estuary: Mobile Bay, Alabama, Journal of Marine Systems, 191, 38-50, https://doi.org/10.1016/j.jmarsys.2018.12.004, 2019.

182) Paniagua-Arroyave, J.F., A. Valle-Levinson, P. Adams, S. Parra, Coherence between infragravity waves and ambient water motions over cape-associated shoals, Continental Shelf Research, 173, 27-42, 2019.

183) Paniagua-Arroyave, J.F., P. Adams, S. Parra, A. Valle-Levinson, Observations of surface-gravity-wave scattering and dissipation by an isolated shoal related to a cuspate foreland, Continental Shelf Research, 173, 43-55, 2019.

184) Pain, A.J., J.B. Martin, C. R. Young, L. Huang, A. Valle-Levinson, Organic matter quantity and quality across salinity gradients in conduit- versus diffuse flow-dominated subterranean estuaries, Limnology and Oceanography, doi: 10.1002/lno.11122, 2019.

185) Nascimento, F., A. Valle-Levinson, A. Sottolichio, N, Senechal, Overtide generation by wind-induced waves in a tidal inlet of SW France, Continental Shelf Research, 174, 66-75, 2019.

186) Valle-Levinson, A., C.A.F. Schettini, E.Truccolo. Subtidal variability of exchange flows produced by river pulses, wind stress and fortnightly tides in a subtropical stratified estuary. Estuar. Coast Shelf Sci, 221, 72-82, 2019.

187) Deng, F., W. Jiang, A. Valle-Levinson, S. Feng. 2019. 3D Modal solution for tidally induced Lagrangian residual velocity with variations in eddy viscosity and bathymetry in a narrow model bay. J, Ocean University of China, 18(1), 69-79.

188) Klingbeil, K., J. Becherer, E. Schulz, H.E. de Swart, H.M. Schuttelaars, A. Valle-Levinson, H. Burchard. 2019. Thickness-Weighted Averaging in tidal estuaries and the vertical distribution of the Eulerian residual transport. Journal of Physical Oceanography, 49, 1809-1826.

189) Shi, L. M. Olabarrieta, A. Valle-Levinson, J. C. Warner. 2019. Relevance of wind stress and wave-dependent ocean surface roughness on the generation of winter meteotsunamis in the Northern Gulf of Mexico, Ocean Modelling, 140, 101408.

190) Paniagua-Arroyave, J. F., Valle-Levinson, A., Parra, S. M., & Adams, P. N. 2019. Tidal distortions related to extreme atmospheric forcing over the inner shelf. Journal of Geophysical Research: Oceans, 124. https://doi.org/10.1029/2019JC015021

191) Yousif, A., S. Neelamani, A. Valle-Levinson. 2019. Wave transmission, reflection, and dissipation of scrap tire floating breakwater in random waves. ISI J. of Hydraulic Engineering. DOI: 10.1080/09715010.2019.1664342

192) So, S., Juarez, B., A. Valle-Levinson, M. Gillin. 2019. Storm surge from Hurricane Irma along the Florida Peninsula. Estuar. Coast. Shelf Sci., 229, 106402. DOI: 10.1016/j.ecss.2019.106402

193) Juarez, B. A. Valle-Levinson, C. Li. 2020. Estuarine salt-plug induced by freshwater pulses from the inner shelf. Estuar. Coast. Shelf Sci., 232, 106491, doi:10.1016/j.ecss.2019.106491

194) Ross, L., I. Pérez-Santos, B. Parady, L. Castro, A. Valle-Levinson. W. Schneider. Glacial Lake Outburst Flood (GLOF) Events and Water Response in A Patagonian Fjord, Water, 12, 248, 2020; doi:10.3390/w12010248

195) So, S., A. Valle-Levinson, J.A. Laurel-Castillo, J. Ahn, M. Al-Khaldi, Removing wave bias from velocity measurements for tracer transport: the Harmonic Analysis approach, Water, 12, 1138, 2020; doi:10.3390/w12041138

196) Pain, A., J. Martin, C. Young, A. Valle-Levinson, I. Marino. 2020. Carbon and phosphorus processing in a carbonate karst aquifer and delivery to the coastal ocean" Geochimica et Cosmochimica Acta, 269, 484-495

197) Laurel-Castillo, A., A. Valle-Levinson. 2020. Tidal and subtidal variations in water level produced by ocean- river interactions in a subtropical estuary. J. Geophys. Res. 125, e2018JC014116. https://doi.org/10.1029/2018JC014116

198) Pinilla, E., M.I. Castillo, I. Pérez-Santos, O. Venegas, A. Valle-Levinson. 2020. Water age variability in a Patagonian fjord. J. Marine Systems. 210:103376.

199) Valle-Levinson, A., M. Olabarrieta, L. Heilman. 2020. Compound flooding in Houston-Galveston Bay during Hurricane Harvey. Science of the Total Environment. 747, 141272.

200) Valle-Levinson, A., V. Kourafalou, R. Smith, Y. Androulidakis, 2020. Flow structures over mesophotic coral ecosystems in the eastern Gulf of Mexico. Continental Shelf Research. 207, 104219.

201) Yousif, A., S. Neelamani, A. Valle-Levinson. 2020. Hydrodynamic performance of tire-based floating breakwater. Marine Georesources and Geotechnology. DOI: 10.1080/1064119X.2020.1795761

202) Valle-Levinson, A., J.B. Martin. 2020. Solar activity and lunar precessions influence extreme sea-level variability in the U.S. Atlantic and Gulf of Mexico coasts. Geophysical Research Letters. DOI: 10.1029/2020GL090024

203) Guerra-Chanis, G.E., S. So, A. Valle-Levinson. 2021. Effects of hurricane Irma on residual flows and saltwater intrusion in a subtropical estuary. Regional Studies Mar. Sci., 101568.

204) Bellafiore, D., C. Ferrarin, F. Maicu, G. Manfe, G. Lorenzetti, G. Umgiesser, L. Zaggia, A. Valle-Levinson. 2021 Saltwater intrusion in a Mediterranean delta under a changing climate. J. Geophysical Research., 126 (2), e2020JC016437.

205) Alyousif, A., J.A. Laurel-Castillo, S. So, S.M. Parra, P. Adams, A. Valle-Levinson. 2021. Subinertial hydrodynamics around a cape influenced by a western boundary current. Estuarine, Coastal & Shelf Science, 251, 107199.

206) Serrano, D., A. Valle-Levinson, 2021. Effects of river discharge and the California Current on pycnocline depth at the eastern entrance to the Gulf of California. Continental Shelf Research, 215, 104356.

207) Quesadas, M., C. Enriquez, A. Valle-Levinson, 2021. Natural and anthropogenic effects on microplastic distribution in a hypersaline lagoon. Science of the Total Environment,776, 145803.

208) Alyousif, A., A. Valle-Levinson, P. Adams, J.A. Laurel-Castillo. 2021. Tidal and Subtidal hydrodynamics over ridge-swale bathymetry, Continental Shelf Research, 219, 104392.

209) Branyon, J., A. Valle-Levinson, I. Mariño, C. Enriquez. 2021. Intratidal and residual flows around inlets of a reef lagoon. Estuaries and Coasts. https://doi.org/10.1007/s12237-021-00940-3

210) Valle-Levinson, A., C. Enriquez, I. Mariño, 2021. Competition between atmospheric and tidally attenuated forcing in an elongated coastal lagoon. Estuaries and Coasts. https://doi.org/10.1007/s12237-021-00947-w

211) Valle-Levinson, A., M. Marani, L. Carniello, A. D'Alpaos, S. Lanzoni. 2021. Astronomic link to anomalously high mean sea level in the northern Adriatic Sea. Estuar. Coast & Shelf Sci. 257, 107418, https://doi.org/10.1016/j.ecss.2021.107418

212) Valle-Levinson, A. 2021. Dynamics-based classification of semienclosed basins. Regional Studies Mar. Sci., 46, 101866. https://doi.org/10.1016/j.rsma.2021.101866

213) Ortals, C., Cordero, O., Valle-Levinson, A., & Angelini, C. 2021. Flows, transport, and effective drag in intertidal salt marsh creeks. Journal of Geophysical Research: Oceans, 126, e2021JC017357. https://doi.org/10.1029/2021JC017357

214) Buchan, S. I. Pérez-Santos, D. Narváez, L. Castro, K. Stafford, M. Baumgartner, A. Valle-Levinson, P. Montero, L. Gutiérrez, C. Rojas, G. Daneri, S. Neira 2021. Intraseasonal variation in southeast Pacific blue whale acoustic presence, zooplankton backscatter, and oceanographic variables on a feeding ground in Northern Chilean Patagonia. Progress in Oceanography. 199. 102709.

215) Justic et al. 2021. Transport Processes in the Gulf of Mexico Along the River-Estuary-Shelf-Ocean Continuum: a Review of Research from the Gulf of Mexico Research Initiative. Estuaries and Coasts. https://doi.org/10.1007/s12237-021-01005-1

216) Zarzuelo, C., A. Lopez-Ruiz, A. Valle-Levinson, M. Diez-Minguito, M. Ortega-Sanchez. 2022. Bridge-piling modifications on tidal flows in an estuary. Coastal Engineering, 173, 104093. https://doi.org/10.1016/j.coastaleng.2022.104093

217) Valle-Levinson, A., M.A. Daly, B. Juarez, L. Tenorio-Fernandez, M. Fagundes, C.B. Woodson, S.G. Monismith, 2022. Influence of kelp forests on flow around headlands. Sci. Tot. Environm., 825, 153952. http://dx.doi.org/10.1016/j.scitotenv.2022.153952

218) Valle-Levinson, A. 2022. Introduction to Estuarine Hydrodynamics. Cambridge University Press. 205 pp. DOI: 10.1017/9781108974240

219) Juarez, B., A. Valle-Levinson, A. Canestrelli. 2022. Mechanisms of salt-plug formation by an along-shelf buoyant current: a numerical model approach. J. Geophys. Res., 127 (4), e2021JC017971. https://doi.org/10.1029/2021JC017971

220) Athie de Velasco, G., D. Salas-Monreal, A. Valle-Levinson, 2022. Subinertial flow patterns in a tropical coral reef system of the southwestern Gulf of Mexico, Estuarine, Coastal & Shelf Science, 275, 107991, https://doi.org/10.1016/j.ecss.2022.107991.

221) Monismith, S.G., M. Alnajjar, M.A. Daly, A. Valle-Levinson, B. Juarez, M. Fagundes, T, Bell, C.B. Woodson, 2022. Kelp forest drag coefficients derived from tidal flow data. Estuaries and Coasts, https://doi.org/10.1007/s12237-022-01098-2.

222) Juarez, B., S. Stockton, K. Serafin, A. Valle-Levinson, 2022. Compound flooding in a subtropical estuary caused by Hurricane Irma 2017. Geophysical Research Letters, 49, e2022GL099360.

223) Rickerich, S., L. Ross, A. Valle-Levinson, 2022. Wave enhanced overtides in an idealized tidal inlet system. J. Geophys. Res: Oceans. 127, e2022JC018848.

224) Guerra-Chanis, G.E., J.A. Laurel-Castillo, C.A.F. Schettini, G. Kakoulaki, A.J. Souza, A. Valle-Levinson, 2022. Saltwater intrusion in estuaries with different dynamic depths. Regional Studies in Marine Science, 51, 102186.

225) Zarzuelo, C., A. Valle-Levinson, A. Lopez-Ruiz, M. Diez-Minguito, M. Ortega-Sanchez. 2023. Bridge-piling modifications on the momentum balance in an estuary: the role of tides, winds and seasonality. Ocean Engineering, 271(6), 113746. https://doi.org/10.1016/j.oceaneng.2023.113746

226) Chen, W., B. Jacob, A. Valle-Levinson, E. Stanev, J. Staneva, T.H Badewien. 2023. Subtidal secondary circulation induced by eddy viscosity-velocity shear covariance in a predominantly well-mixed tidal inlet. Front. Mar. Sci., Sec. Coastal Ocean Processes,10, doi: 10.3389/fmars.2023.1105626

227) Hosseini, S.T. J. Pein, E.V. Stanev, A. Valle-Levinson, C. Schrum. Longitudinal and lateral circulation and tidal impacts in salt-plug estuaries. Front. Mar. Sci. doi:10.3389/fmars.2023.1152625

228) Shi, L., C. Ortals, A. Valle-Levinson, M. Olabarrieta. 2023. Influence of river discharge on tidal and subtidal flows in a microtidal estuary: implications on velocity asymmetries. Advances in Water Resources.

229) Hayter, E.J., A. Valle-Levinson, A. Mehta. 2023. An assessment of sedimentary equilibrium at a Florida estuary: The Loxahatchee. Estuar. Coast. Shelf Sci., 108394, https://doi.org/10.1016/j.ecss.2023.108394

230) Valle-Levinson, A., M. Li. 2023. Climate change and saltwater intrusion in estuaries. Chapter 6 in: Climate Change and Estuaries, Kennish, M. et al., eds. Taylor CRC Press, 684 pp. 10.1201/9781003126096-7

231) Valle-Levinson, A. 2023. Large Estuaries (Effects of Rotation). In: Reference Module in Earth Systems and Environmental Sciences. Elsevier. 10.1016/B978-0-323-90798-9.00079-2

232) Laurel-Castillo, A., A. Valle-Levinson. 2023. A statistics-based analytical framework for intratidal and tidally averaged salinity distribution in estuaries. J. Geophys. Res., 128(12), 10.1029/2023JC019813

233) Valle-Levinson, A. 2024. Classification of Estuarine Circulation. In: Reference Module in Earth Systems and Environmental Sciences. 10.1016/B978-0-323-90798-9.00118-9

234) Valle-Levinson, A. 2024. Collection and processing of underway, bottom-tracking ADCP data. In: Treatise on Estuarine and Coastal Science (Second Edition), D. Baird & M. Elliott, Eds. Academic Press, 10.1016/B978-0-323-90798-9.00023-8

235) Kurczyn. J.A., E. Beier, A. Valle-Levinson, L. Carrillo, H. Gonzalez. 2024. Thermohaline and current variability off the west Yucatan peninsula coast, Estuar. Coast. Shelf Sci. 10.1016/j.ecss.2024.108661

236) Ruben, Z. Murgulet, D., Lopez, C.V., Marino-Tapia, I., Valle-Levinson, A. and Matthews, K., 2024. Influence of Submarine Groundwater Discharge on the Nutrient Dynamics of a Fringing-Reef Lagoon. http://dx.doi.org/10.2139/ssrn.4779013

237) Valle-Levinson, A. 2024. Linkage of El Niño-Southern Oscillation to astronomic forcing. Environmental Research Letters, 19, 104004. https://doi.org/10.1088/1748-9326/ad7046

238) Valle-Levinson, A., C. Pattiaratchi. 2024. Filling in Munk's 'orbital gap' in climate and sea-level variability. Environmental Research Letters, https://doi.org/10.1088/1748-9326/ad7ee5

239) Hayter, E.J.; Mehta, A.J.; Jaeger, J.M.; Valle-Levinson, A.; Manning, A.J.; Forlini, C. 2025.Wind, Water Level, and Fluid Mud in Lake Apopka, Florida. J. Mar. Sci. Eng., 13, 38. https://doi.org/10.3390/jmse13010038

240) Valle-Levinson, A., C. Pattiaratchi. 2025. Reply to Comment on 'Linkage of El Niño-Southern Oscillation to astronomic forcing'. Environmental Research Letters 20(6), DOI: 10.1088/1748-9326/add1f3

241) Álvarez-Silva, O., J.F. Paniagua-Arroyave, E. Cantero, G.C. Lessa, D. Moreira, L. Ross, P. Santoro, C.A.F. Schettini, M.E. Williams, A. Valle-Levinson. 2025. Semi-enclosed coastal systems of South America: compilation and dynamic-based classification, Continental Shelf Research, 292, 105493. https://doi.org/10.1016/j.csr.2025.105493

242) Llorente, V.J., E.M. Padilla, M. Díez-Minguito, A. Valle-Levinson. 2025. Conserved quantities in the ocean surface boundary layer: A fresh perspective on a classical problem. Applied Mathematical Modelling, 150(A), 116367. https://doi.org/10.1016/j.apm.2025.116367

243) Torres-Córdoba, J., A. Valle-Levinson, V.G. Toro-Valencia, Y. Cardona, J.F. Paniagua-Arroyave, M.C. Aguirre-Perez. 2025. Tidal dynamics in a quasi-rectangular semi-enclosed basin with a constriction at its flank. Estuarine, Coastal, Shelf Sci., 325, 109496, https://doi.org/10.1016/j.ecss.2025.109496

244) Huang W., C. Li , A.Valle-Levinson , D. Gann , M.C. Sukop, J.T. Obeysekera , T. Troxler. 2025. Wind-driven exchange flow and inter-basin connectivity in a multi-inlet bay during hurricane and non-hurricane periods. Ocean Modelling, https://doi.org/10.1016/j.ocemod.2025.102624

245) Garel E., Khosravi M., Díez-Minguito M. and Valle-Levinson A. 2025. Fortnightly switching of residual flow drivers produced by seawater intrusion in a long, non-rotating estuary. Estuaries & Coasts. 48, 176 (2025). https://doi.org/10.1007/s12237-025-01605-1

246) Khosravi, M., E. Garel, A. Fortunato, A. Lopez-Ruiz, A. Valle-Levinson. 2025. Fortnightly variability of the lateral structure of residual flows along non-rotating estuaries. Estuar. Coast. Shelf Sci., 326, 109562, https://doi.org/10.1016/j.ecss.2025.109562

247) Torres-Cordoba, J., A. Valle-Levinson. 2025. Are trends of Gulf Stream transport uniform along the Florida Shelf? Geophysical Research Letters. 52, e2025GL118418. https://doi.org/10.1029/2025GL118418

248) Gastelu-Barcena, M.F., J.A. Laurel, M. Olabarrieta, C. Angelini, D. Fugate, 2025. Exchange flow structure at two inlets of a multiple-inlet subtropical estuary. Estuarine, Coastal and Shelf Science, 109649. https://doi.org/10.1016/j.ecss.2025.109649

249) Torres-Cordoba, J., J.A., Laurel-Castillo, A. Valle-Levinson, M.F. Gastelu-Barcena, 2025. Local wind and remote forcing effects on Exchange flows at the entrance to a subtropical estuary. J. Mar. Syst., 104170. https://doi.org/10.1016/j.jmarsys.2025.104170

250) Gastelu-Barcena, M.F., A. Valle-Levinson & J.L. Blanco. 2026. Transverse structure of tidal and exchange flows in a Magellan glacial fjord. Journal of Marine Systems. 255. 104214. https://doi.org/10.1016/j.jmarsys.2026.104214

251) Huguenard, K.D., A. Valle-Levinson, 2026. Microstructure observations of eddy-shear covariance (ESCO) in a partially mixed estuary. Estuar. Coast. Shelf. Sci. https://doi.org/10.1016/j.ecss.2026.109878

HONORS, AWARDS, AND PRIZES

Recipient of the University of Baja California President's Award to the highest grade point average of the Class	1985
Valedictorian of the School of Marine Sciences, Baja California	1985
Recipient of the Kenneth P. Staudte Award in recognition of innovative and important research contributing to the resolution of an environmental problem, Marine Sciences Research Center	1991
Recipient of the Sea Grant Association Student Abstract Award	

Competition, Environmental Studies	1992
1998 Editors' Citation for Excellence in Refereeing for Journal of Geophysical Research-Oceans	1999
Recipient of CAREER grant (U.S. National Science Foundation's most prestigious award for new faculty)	2000
Seminar Presenter as part of the Florida Sea Grant Elise B Newell Seminar Series, Florida Gulf Coast University	2008
Recipient of Fulbright Fellowship (Senior Specialists Program) to Chile	2008
Recipient of Gledden Fellowship from University of Western Australia	2009
Distinguished Professor, Universidad Catolica del Norte, Chile	2010
Distinguished Professor Visit, Mexican Academy of Sciences	2010
Level III (highest possible) Scientist in the Mexican System of Research	2010
Visiting Professor, CINVESTAV, Merida	2010
Visiting Professor, CINVESTAV, Merida	2011
Visiting Fellowship awarded by the Chilean Science and Technology Council	2011
Visiting Professorship awarded by Utrecht University	2012
Fulbright Senior Fellowship to Spain	2012
Corresponding Member of the Mexican Academy of Sciences	2012
Departmental Outstanding Faculty Mentor Award, U. of Florida	2012
Distinguished Visiting Professor, University of Bordeaux	2014
Visiting Professorship, Kyushu University, Japan	2014
Senior International Educator of the Year, U. of Florida	2014
Departmental Research Mentor Award, U. of Florida	2015
Visiting Professor, University of Pernambuco, Brazil	2015
Water Institute Fellow, University of Florida	2016

Term Professor, University of Florida	2017
Departmental Research Mentor Award, U. of Florida	2018
Visiting Professor, University of Padova	2019
NSF Rotator in the Physical Oceanography Program	2021-24
Robert and Maude Gledden fellowship from the University of Western Australia	2024
Erasmus Mundus Visiting Professor, University of Genova	2025

Ph.D. Chair

1. Adviser for K. Holderied (now at NOAA)
2. Adviser for Cristobal Reyes (Ph. D. 2001, now at Universidad del Mar, Mexico)
3. Adviser for Mario Caceres (Ph. D. 2001, now at Universidad de Valparaiso, Chile)
4. Adviser for Rosario Sanay (Ph.D. 2003, now at Universidad Veracruzana, Mexico)
5. Adviser for Andres Sepulveda (Ph.D. 2004, now at Universidad de Concepcion, Chile)
6. Adviser for David Salas-Monreal (M.S. 2002; Ph.D. 2006 now at Universidad Veracruzana, Mexico)
7. Adviser for Jung Woo Lee (Ph.D., 2010, now at East Carolina University)
8. Adviser for Amy Waterhouse (Ph.D., 2010, now at Scripps Institution of Oceanography)
9. Adviser for Berkay Basdurak (Ph.D., 2010, now in Middle-East Tech Univ, Turkiya)
10. Adviser for Chloe Winant (Ph.D. 2011, now at Howard Bishop Middle School)
11. Adviser for Kim Huguenard (Arnott) (Ph.D. 2013, now at University of Maine)
12. Adviser for Sangdon So (Ph.D. 2013, now at St Johns Water Management District)

13. Adviser for Lauren Ross (Ph.D. 2014, now at University of Maine)
14. Adviser for Sabrina Parra (Ph.D. 2014, now at Johns Hopkins University)
15. Adviser for Jackie Branyon (Ph.D. 2015, now at Kimley-Horn)
16. Adviser for Armando Laurel (Ph.D. 2016, now at Mexican Water Directorate)
17. Adviser for Fernanda Nascimento (Ph.D. 2017, now at Warnemunde University)
18. Adviser for Ahmad Yousif (Ph.D. 2017, now at Kuwait University)
19. Adviser for Mohammad Alkhaldi (Ph.D. 2018, now at Kuwait Institute for Scientific Research)
20. Adviser for Gisselle Guerra (Ph.D. 2019, now at Instituto Tecnologico de Panama)
21. Adviser for Braulio Juarez (Ph.D. 2019, now at Instituto de Investigaciones Oceanologicas, Mexico)
22. Adviser for Maria Fernanda Gastelu (PhD 2023, now at Virginia Tech)
23. Adviser for Juan Torres
24. Adviser for Xavier Sanchez

M.S. Chair

1. Adviser for Mayra Riveron-Enzastiga (M.S. 2006)
2. Adviser for Andrea Piñones (M.S. 2006)
3. Adviser for Diego Narvaez (M.S. 2006)
4. Adviser for Hande Caliskan (M.S. 2006)
5. Adviser for Ruth Lane (M.S. 2007)
6. Adviser for Kimberly Arnott (M.S., 2009)
7. Adviser for Nick Zwemer (M.S., 2011)
8. Adviser for Krista Henrie (M.S., 2012)
9. Adviser for Gisselle Guerra (M.S., 2012)

10. Adviser for Kirsten Nielsen (M.S. 2013)

11. Adviser for Patrick Miskel (M.S. 2014)

12. Adviser for Zak Bedell (M.S. 2017)

13. Adviser for Matlack Gillin (M.S. 2018)

Current Ph.D. students: Juan Guillermo Torres, Xavier Sanchez, Celeste Delgado

PROFESSIONAL SERVICE

- Editor in Chief of Continental Shelf Research. Associate Editor of Estuaries and Coasts, Journal of Oceanography
- NSF Program Director Physical Oceanography 2021-2023
- Co-Vice Chair Gordon Research Conference on Coastal Dynamics 2025
- Co-Chair Gordon Research Conference on Coastal Dynamics 2027
- Co-Chair CERF Meeting 2027

Exhibit D

January 27, 2026, Letter to the Atlantic Menhaden Management Board

Atlantic Menhaden Management Board
Atlantic States Marine Fisheries Commission
1050 N. Highland St., Suite 200 A-N
Arlington, VA 22201

Dear Chairman Clark:

We submit this letter regarding the Board's Plan Development Team's preparation of an addendum to the Atlantic Menhaden Fishery Management Plan ("FMP") focusing on the purse seine fishery in the lower Chesapeake Bay. We respectfully request that this letter, and the exhibits included herein, be included in the supplementary materials in advance of the Board's meeting, and also distributed to Board members.

As it stands, the premise for the Board's proposed addendum is that the recent decline in Maryland menhaden pound net catches can be ascribed to Ocean Harvesters' purse seine fishery in the lower Bay creating a "gauntlet" that has prevented the fish from reaching pound nets in the mid and upper Bay. Significantly, neither the Board nor the PDT have examined this premise, but rather have just accepted it as fact. Ocean Harvesters respectfully submits that the Board should task the PDT to examine the premise because the information presented below demonstrates that other more plausible factors may be causing declining pound net catches.

Pound Net Effort in the Bay Has Declined Dramatically in Recent Years

We recently received data from the Atlantic Coastal Cooperative Statistics Program ("ACCSP") Data Warehouse pursuant to an August data request of a month-by-month data pull of Maryland pound net effort and catches. Please refer to Exhibit A for a condensed version of the raw data.[1] That data highlighted a trend that can directly explain declining catches. Maryland's pound netting enterprise is in decline. From the years 2013 to 2024, the total number of trips reported by Maryland pound net fisherman decreased from 1,835 in 2013 to a mere 284 in 2024. A substantial drop-off occurred between 2016 and 2017, when Maryland pound net catches stair-stepped down.

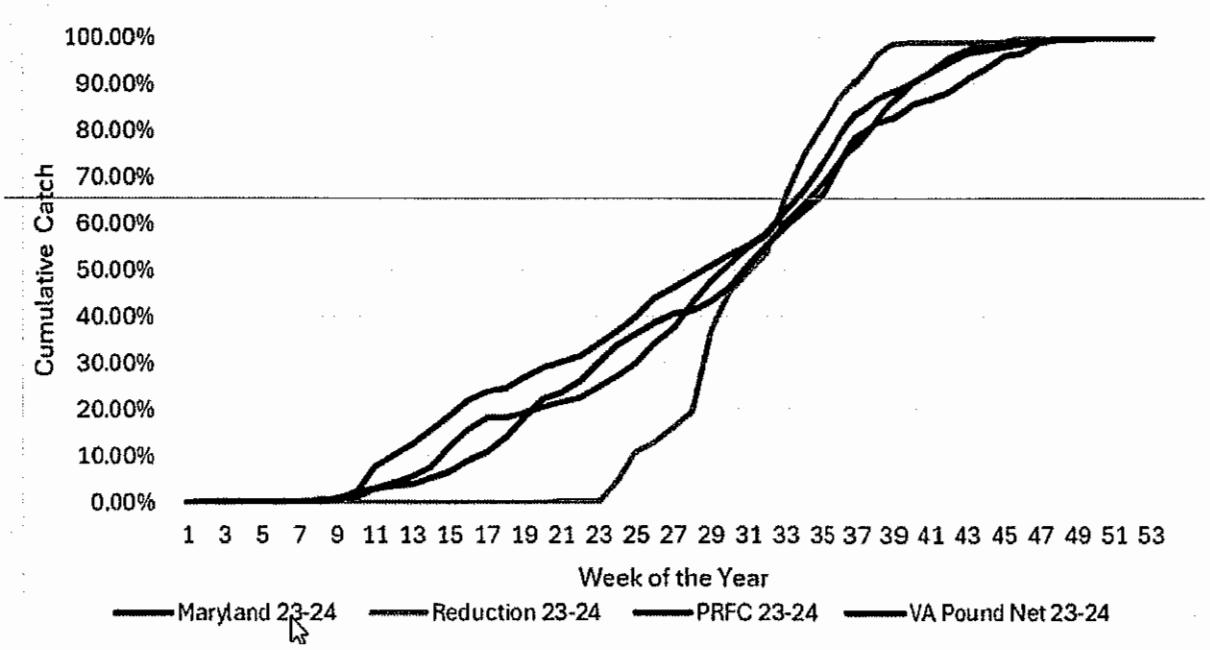
[1] The raw excel data files received pursuant to the ACCSP data pull are available upon request.

The maximum number of vessels operating in any month during these years also decreased, from a high of 25 in 2013, to 6 in 2024, with the total number of fishermen associated with these pound nets decreasing at the same level.

In years where catches for the purse seine fleet decreased, such as in 2017, when ASMFC lowered the catch cap for Atlantic menhaden by more than 40%, pound net landings in 2018 and 2019 did not proportionately skyrocket in response. Thus, to the extent a gauntlet exists (and it doesn't), the gauntlet should have been more of an impediment to pound net fishing when both pound net effort and catches were higher.

Catch Rates and Fishing Effort Do Not Show Negative Correlation or Causation

The graph below was presented to the PDT last week. As indicated, the graph lays out weekly catch rates for the reduction and pound net fisheries. In particular, we draw the Board's attention to weeks 21 through 40 of the year as indicated on the X-axis. If the purse seine fleet was indeed creating a gauntlet preventing Atlantic menhaden from traveling into the upper-Bay during those weeks, the Bay's pound net fishery numbers *should* indicate a corresponding steep decline in catch rate during these weeks. Instead, the catch rates remain on a relatively steady increase throughout the year; put differently, the slope of the lines depicting pound net catch rates from week 9 to week 45 is remarkably consistent.



The relationship, or lack thereof, demonstrated in this graph aligns with a preliminary analysis we asked Georgetown Economic Services of Washington, D.C. to conduct using public data presented

to the Board in August 2025.[2] Based on records of reduction purse seine effort, which is indicative of menhaden's presence in the lower Bay, in the months during 2022-2024 when the number of reduction purse seine net sets exceeded its 10-year average, the Maryland pound net harvest size also tended to be above its 10-year average. The converse was also true. In fact, the direct relationship was statistically significant over these years. Attached hereto as Exhibit B is the more detailed memorandum of the statistical analysis prepared by Georgetown Economic Services. As with the chart included above, if the so-called gauntlet theory posed by Maryland were the reason behind the falling landings of Atlantic menhaden by Maryland pound-netters, the relationship between purse seine effort and pound net landings would instead be inversely related. However, the relationship does not bear out such a conclusion. The PDT should conduct is own examination using the biweekly purse seine set data that Director Fegley excerpted from the April Work Group Report and the ACCSP data pull providing monthly Maryland pound net menhaden landings.

In conclusion, our brief submission only scratches the surface of what appears to be a more complicated set of reasons for the decline in Maryland pound net menhaden catches. Before ascribing blame to Ocean Harvesters and implementing further restrictions in the Bay via a premature addendum, the Board should task the PDT to examine a range of considerations, including environmental and economic conditions, that may be a more direct cause of declining pound net catches.

Thank you for your consideration of this letter and the issues it presents. Our representatives will be available at the Board meeting to discuss these matters in more detail.

Respectfully submitted,

Ben Landry
Vice President of Public Affairs
Ocean Fleet Services

---

[2] *See* Atlantic Menhaden Board Presentations, Slides as Presented by Lynn Fegley (MD DNR), at https://asmfc.org/wp-content/uploads/2025/08/AtlMenhadenBoardPresentations_August2025.pdf.

Exhibit A – Condensed Data Pull of Pound Net Catches and Effort from the Atlantic Coastal Cooperative Statistics Program

YEAR	MONTH	LIVE POUNDS	DOLLARS	TOTAL FISHERMEN	TOTAL VESSELS	TRIP COUNT
2013	JANUARY	3153	378.36	3	3	7
2013	MARCH	29326	3225.86	4	4	33
2013	APRIL	811000	98827.31	21	23	239
2013	MAY	1543416	170094.95	25	23	328
2013	JUNE	1292318	184752.25	28	25	355
2013	JULY	833336	93911.32	17	16	228
2013	AUGUST	690168	89430.24	20	17	226
2013	SEPTEMBER	468509	60997.64	17	17	200
2013	OCTOBER	398620	51820.6	7	6	109
2013	NOVEMBER	194753	21422.83	10	9	65
2013	DECEMBER	119455	14334.6	5	5	34
2014	JANUARY	8730	785.7	5	4	11
2014	APRIL	543687	71968.17	17	16	129
2014	MAY	857710	112749.08	21	19	241
2014	JUNE	1031236	155653.72	22	22	289
2014	JULY	972667	167804.37	19	18	250
2014	AUGUST	919085.67	210418.66	17	15	210
2014	SEPTEMBER	1092636	282085.11	22	16	245
2014	OCTOBER	594188	154902.88	16	14	159
2014	NOVEMBER	179532	23219.16	14	11	82
2014	DECEMBER	51650	5681.5	5	5	22
2015	JANUARY	6650	864.5	3	3	5
2015	APRIL	545015	81752.25	10	11	104
2015	MAY	1148126	149373.42	19	20	272
2015	JUNE	1421704	227603.92	18	17	309
2015	JULY	784689	125619.68	16	14	225
2015	AUGUST	1025680	163558.8	15	16	211
2015	SEPTEMBER	1110189	177915.24	17	15	237
2015	OCTOBER	549020	87843.2	11	11	129
2015	NOVEMBER	115980	15193.4	9	8	47
2015	DECEMBER	86720	12975.2	8	7	33
2016	MARCH	339075	50861.25	9	7	51
2016	APRIL	433176	68888.16	13	11	105
2016	MAY	609640	90966	15	10	147
2016	JUNE	1253667	188410.05	17	13	224
2016	JULY	682170	115968.9	14	8	179

2016	AUGUST	1054217	284638.59	14	8	200
2016	SEPTEMBER	660337	79240.44	10	8	150
2016	OCTOBER	132150	21144	7	6	56
2016	NOVEMBER	16770	2683.2	4	3	19
2016	DECEMBER	45553	7288.48	4	4	18
2017	MARCH	37621	5643.15	4	3	14
2017	APRIL	314830	53521.1	6	4	75
2017	MAY	178413	28546.08	7	4	75
2017	JUNE	424190	68327.4	7	7	95
2017	JULY	530662	122052.26	10	6	129
2017	AUGUST	325802	74934.46	13	9	111
2017	SEPTEMBER	621406	99424.96	10	9	123
2017	OCTOBER	262240	86539.2	7	6	84
2017	NOVEMBER	26375	8703.75	9	6	27
2018	APRIL	794300	127344	13	9	121
2018	MAY	650790	104126.4	12	8	145
2018	JUNE	475682	80865.94	14	11	181
2018	JULY	191730	34511.4	11	7	105
2018	AUGUST	262990	36818.6	8	5	89
2018	SEPTEMBER	85900	15462	7	6	55
2018	OCTOBER	161740	27495.8	7	7	52
2019	MARCH	174740	24463.6	7	4	29
2019	APRIL	740970	103735.8	12	9	127
2019	MAY	230600	36896	6	4	70
2019	JUNE	295350	44302.5	10	6	78
2019	JULY	397570	59635.5	10	7	93
2019	AUGUST	518040	82886.4	11	6	104
2019	SEPTEMBER	519697.5	83151.6	9	6	92
2019	OCTOBER	176270	28203.2	6	6	58
2019	NOVEMBER	38980	5067.4	6	6	25
2019	DECEMBER	6570	1051.2	4	3	11
2020	MARCH	224280	35884.8	8	7	44
2020	APRIL	172430	27588.8	10	7	58
2020	MAY	169830	30569.4	7	5	70
2020	JUNE	626760	125352	10	9	112
2020	JULY	290350	232280	7	5	102
2020	AUGUST	264420	87258.6	7	5	75
2020	SEPTEMBER	407690	163076	7	5	81
2020	OCTOBER	190924	30547.84	6	5	61
2020	NOVEMBER	22210	3553.6	6	5	19
2020	DECEMBER	32890	5262.4	5	4	14
2021	MARCH	63750	9562.5	4	4	13
2021	APRIL	259134	41461.44	9	7	59

2021	MAY	320902	64180.4	10	8	63
2021	JUNE	698086	111693.76	11	10	132
2021	JULY	553935	88629.6	8	6	92
2021	AUGUST	325630	52100.8	7	5	75
2021	SEPTEMBER	298214	47714.24	9	7	72
2021	OCTOBER	254650	40744	8	7	64
2021	NOVEMBER	10820	1731.2	4	4	11
2021	DECEMBER	45120	7219.2	5	4	23
2022	MARCH	365270	65748.6	5	4	33
2022	APRIL	471150	89518.5	6	5	76
2022	MAY	125963	20154.08	6	5	43
2022	JUNE	395126	79025.2	12	9	125
2022	JULY	343940	61909.2	10	8	101
2022	AUGUST	565990	101878.2	11	8	121
2022	SEPTEMBER	571080	114216	11	8	101
2022	OCTOBER	369740	44368.8	8	6	71
2022	NOVEMBER	80600	13702	5	4	23
2022	DECEMBER	42030	7145.1	4	3	19
2023	APRIL	282120	64887.6	8	5	68
2023	MAY	102450	24588	7	5	42
2023	JUNE	238020	57124.8	9	7	75
2023	JULY	432930	86586	8	6	81
2023	AUGUST	286420	63012.4	6	6	69
2023	SEPTEMBER	318940	70166.8	6	5	66
2023	OCTOBER	253400	55748	6	5	63
2023	NOVEMBER	34320	7550.4	5	5	26
2023	DECEMBER	10160	2032	4	3	11
2024	MARCH	134510	29592.2	6	5	48
2024	APRIL	96020	20164.2	6	5	42
2024	MAY	8022	2165.94	5	4	13
2024	JUNE	10696	2353.12	7	6	39
2024	JULY	2965	1719.7	6	5	15
2024	AUGUST	55240	13257.6	7	6	37
2024	SEPTEMBER	156925	36092.75	5	5	45
2024	OCTOBER	64780	13603.8	4	3	33
2024	NOVEMBER	7540	1583.4	5	4	12

Exhibit B – Analysis of Maryland Harvest Sizes and the Number of Virginian Nets Set

I was provided the following data:

1) semi-monthly number of nets set by Virginian fisheries for the period 2015 to 2024, along with the ten-year average for each month (Table 2 in Atlantic Menhaden Board Presentation); and
2) monthly Maryland Pound Net Harvest for the period 2022 to 2024, along with the 10-year average harvest for each month (Figure 11 in Atlantic Menhaden Board Presentation).

I aggregated the number of nets set by year and month in order to transform it from a semi-monthly series to a monthly series. Further, both the nets set, and the Maryland harvest data, show monthly seasonality. I de-seasonalized the data by subtracting the 10-year average for each month from each series. This resulted in two series of deviations: (1) the monthly deviation of the number of nets set from the 10-year average number of nets set and (2) the monthly deviation of the Maryland harvest size from the 10-year average harvest size.

Next, I regressed the monthly Maryland harvest size deviation (the dependent variable) on the following independent variables: (1) the monthly number of nets set deviation and (2) the one-month lag of the Maryland harvest size deviation. I included the second independent variable because the monthly harvest size deviations show strong autocorrelation. That is, the size of the harvest deviation in one month affects the harvest deviation in the following month.

The table below shows the results of the regression:

Table 1: Regression Results					
	Estimate	Standard Error	t value	p value	
Intercept	-24.1612	23.0497	-1.048	0.30239	
Number of nets set deviation	0.6742	0.2165	3.115	0.00387	**
1-month lagged harvest size deviation	0.8164	0.1141	7.152	4.05E-08	***

The coefficient of the number of nets set deviation variable is 0.6742 and – with a p value of 0.00387 – is statistically significant at the 1 percent level. This result indicates a strong, positive relationship between the number of nets set deviation and the Maryland harvest deviation. Thus, when the number of Virginian nets set exceeds its 10-year average, the Maryland harvest size also tends to be above its 10-year average. Conversely, when the number of Virginian nets set is below its 10-year average, then the Maryland harvest size also tends to be below its 10-year average. Since it is highly unlikely that the number of Virginian nets set could be causing the size of the Maryland harvest (or vice versa), the most likely interpretation of this positive relationship is that both variables are responding to a common cause – namely, the extent of the fish presence in the bay.

Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
703.842.0740 • 703.842.0741 (fax) • asmfc.org

MEMORANDUM

TO: **American Eel Management Board**

FROM: **Caitlin Starks, Senior FMP Coordinator**

DATE: **April 28, 2026**

SUBJECT: **2020-2025 Yellow Eel Landings**

This memorandum serves as a review of 2020-2025 yellow eel landings information. The information is provided to aid the Board in annually evaluating landings relative to the coastwide cap.

Yellow Eel Fishery Coastwide Cap

Addendum V (2018) implemented a yellow eel coastwide landings cap of 916,473 pounds as well as a new management trigger and Cap overage policy. In 2024, Addendum VII implemented a new coastwide cap of 518,281 starting in 2025. The coastwide cap is established using I_{TARGET}, an index-based method that provides management advice based on abundance indices and catch information, as well as management goals specified by the Board. The coastwide landings cap for yellow eel of 518,281 pounds remains in place for three years (2025-2027). After three years, prior to the 2028 fishing year, the Board may update the coastwide cap with additional years of catch and abundance data, or maintain the same coastwide cap.

The coastwide landings are annually evaluated against a two-year management trigger. If the coastwide cap is exceeded by 10% (10% of the coastwide cap = 51,828 pounds; coastwide cap + 10%= 570,109 pounds) for two consecutive years, then only states with landings greater than 1% of the coastwide landings, in the year(s) when the management trigger is tripped, will be responsible for reducing their landings to achieve the coastwide cap in the subsequent year. States with landings greater than 1% of the coastwide landings will work collectively to achieve an equitable reduction to the coastwide cap. For states with landings less than 1% of the coastwide landings, if in subsequent years a state's landings exceeds 1% of the coastwide landings after reductions have been applied, that state must reduce their individual state landings in the subsequent year to return to the less than 1% level.

Summary of Recent Landings Trends

Preliminary yellow eel landings from ACCSP indicate that total coastwide landings in 2025 were 260,348 pounds, excluding confidential data. This is a 19% decrease from 2024 and well below the coastwide cap, however, Massachusetts landings (which have been below 1,000 pounds per year since 2021) are unavailable at this time. Table 1 shows each jurisdiction's landings from 2020-2025. A number of factors may have driven the decline in yellow eel landings in recent

years, including international market demand for food fish, decline in demand for yellow eels as bait, a depleted stock, and the 2020 COVID-19 pandemic.

Table 1. Jurisdiction yellow eel landings from 2020-2025

Year	2020	2021	2022	2023	2024	2025*
Maine	7,012	1,368	921	1,104	***C***	***C***
New Hampshire	*Time series average of less than 400*					
Massachusetts	**NA**	269	138	851	**NA**	**NA**
Rhode Island	1,425	1,863	605	2,859	1,928	1,067
Connecticut	2,783	3,255	3,755	1,468	3,448	1,205
New York	9,860	20,022	22,874	13,860	15,439	9,476
New Jersey	23,742	26,273	52,586	48,683	30,387	26,408
Delaware	1,942	4,433	2,967	11,090	8,910	5,868
Maryland	159,816	204,701	187,810	135,266	198,973	183,523
Potomac River Fisheries Commission	24,971	10,439	12,814	20,229	11,316	704
Virginia	21,916	43,228	35,515	50,970	6,206	31,025
North Carolina	3,291	5,505	3,602	1,109	2,469	1,072
South Carolina	*Time series average of less than 400*					
Georgia	*Time series average of less than 400*					
Florida	499	9,050	**NA**	1,960	2,080	999
Total	**257,257**	**330,406**	**323,587**	**312,629**	**281,156**	**260,348**

*2025 landings are preliminary and subject to change.

Due to confidential data, information for New Hampshire, South Carolina, and Georgia have been removed. Massachusetts 2020, 2024, and 2025 landings and Florida 2022 landings are not available.